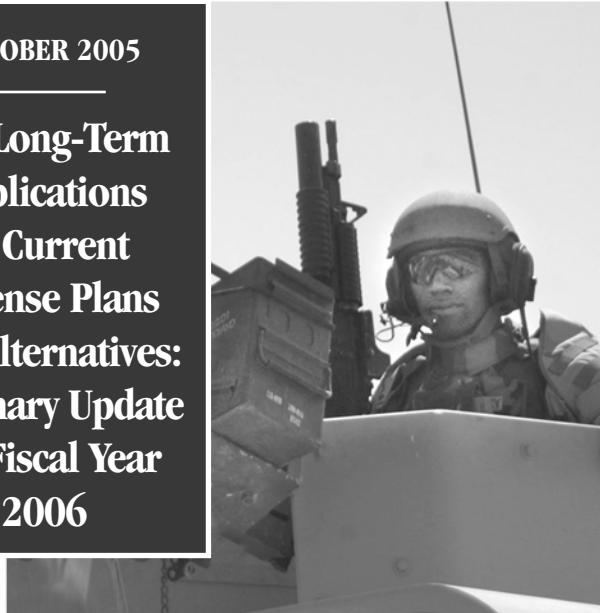
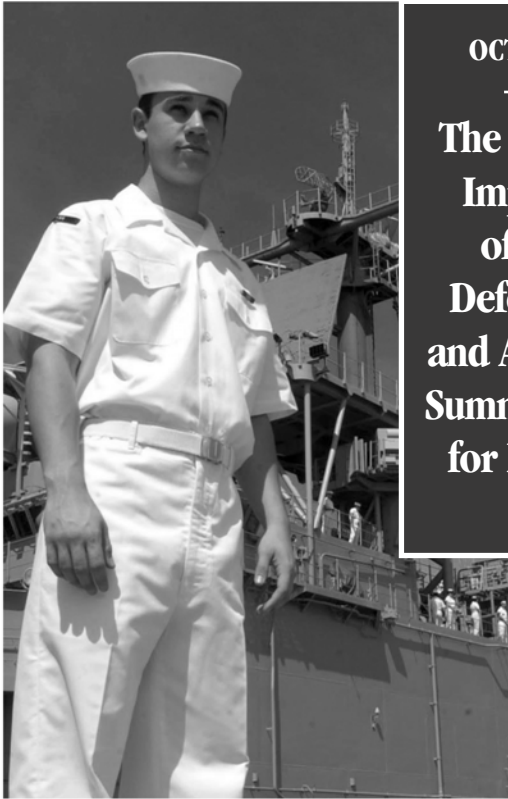


A
CBO
PAPER

OCTOBER 2005

**The Long-Term
Implications
of Current
Defense Plans
and Alternatives:
Summary Update
for Fiscal Year
2006**



Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE OCT 2005		2. REPORT TYPE		3. DATES COVERED 00-00-2005 to 00-00-2005	
4. TITLE AND SUBTITLE The Long-Term Implications of Current Defense Plans and Alternatives: Summary Update for Fiscal Year 2006				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Congressional Budget Office ,Ford House Office Building, 4th Floor ,Second and D Streets, SW ,Washington,DC,20515-6925				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 53	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



The Long-Term Implications of Current Defense Plans and Alternatives: Summary Update for Fiscal Year 2006

October 2005

Notes

Unless otherwise indicated, all years referred to in this paper are fiscal years, and all dollar amounts are expressed in 2006 dollars of total obligational authority.

The projections in this paper deal with resources for the Department of Defense (subfunction 051 of the federal budget) rather than for all national defense activities (function 050).



Preface

What level of budgetary resources might be needed in the long term to execute the Administration's current plans for defense, and what effect on that level would alternative defense plans have? This Congressional Budget Office (CBO) paper addresses those questions. Prepared at the request of the Chairman of the Senate Budget Committee, it updates the resource projections contained in CBO's September 2004 paper *The Long-Term Implications of Current Defense Plans: Summary Update for Fiscal Year 2005* to reflect the changes that the Administration has made to its defense plans in preparing the President's budget request for fiscal year 2006. In addition, this paper includes two alternative scenarios that could reduce the level of defense resources required during the 2012-2024 projection period. CBO will also publish supplementary data on its Web site that provide more details about specific programs. In keeping with CBO's mandate to provide impartial analysis, this paper and the supplementary materials make no recommendations.

Adam Talaber of CBO's National Security Division coordinated the preparation of this paper, under the supervision of J. Michael Gilmore and Matthew S. Goldberg. David Arthur, Daniel Frisk, Eric J. Labs, Joshua Lee, Frances Lussier, and Allison Percy of the National Security Division contributed to the analysis as did Robie Samanta Roy, formerly of CBO. Raymond Hall, David Newman, Matthew Schmit, and Jason Wheelock of CBO's Defense, International Affairs, and Veterans' Affairs Cost Estimates Unit also contributed to the report, under the supervision of Jo Ann Vines. In addition, Robert R. Soule of the Institute for Defense Analyses provided helpful comments on an earlier draft. (The assistance of an external participant implies no responsibility for the final product, which rests solely with CBO.)

Leah Mazade edited the paper, and Janey Cohen proofread it. Cindy Cleveland produced drafts of the manuscript, and Maureen Costantino designed the cover. Allan Keaton prepared the paper for publication. Lenny Skutnik printed the initial copies, and Annette Kalicki and Simone Thomas prepared the electronic version for CBO's Web site.

Douglas Holtz-Eakin
Director

October 2005

CONTENTS

Summary and Introduction	1
Projections of Spending for Operation and Support, Military Construction, and Family Housing	4
Operation and Support	5
Military Construction and Family Housing	17
Cost Risks for Operation and Support, Military Construction, and Family Housing	18
Projections of Spending for Investment	19
Army Investment	21
Navy and Marine Corps Investment	27
Air Force Investment	35
Defense Agency Investment, Including Missile Defenses	40
 Tables	
1. Key Features of CBO's Projections Through 2024 of Current and Alternative Defense Plans	5
2. Army Investment Through 2024 Under CBO's Projection Alternatives	25
3. Navy and Marine Corps Investment Through 2024 Under CBO's Projection Alternatives	28
4. Steady-State Ship Inventories Under CBO's Projection Alternatives	31
5. Air Force Investment Through 2024 Under CBO's Projection Alternatives	38
6. Missile Defense Investment Through 2024 Under CBO's Projection Alternatives	45
 Figures	
1. Past and Projected Resources for Defense	3
2. Comparison of Evolutionary and Transformational Alternatives: All Defense Resources	4
3. Defense Resources as a Percentage of GDP	8

Figures (Continued)

4.	Past and Projected Resources for Operation and Support	9
5.	Operation and Support as a Share of the Defense Budget	10
6.	Past and Projected Resources for the Military Medical System	11
7.	Projected Cost of New Benefits Provided Since 1999 for Military Retirees and Their Families	13
8.	The Transformational Alternative: Operation and Support	16
9.	Past and Projected Resources for Investment	20
10.	Comparison of Evolutionary and Transformational Alternatives: All Defense Investment	21
11.	Past and Projected Resources for Army Investment	23
12.	Comparison of Evolutionary and Transformational Alternatives: Army Investment	24
13.	Past and Projected Resources for Navy and Marine Corps Investment	27
14.	Comparison of Evolutionary and Transformational Alternatives: Navy and Marine Corps Investment	29
15.	Past and Projected Resources for Air Force Investment	36
16.	Comparison of Evolutionary and Transformational Alternatives: Air Force Investment	37
17.	Past and Projected Resources for Defense Agency Investment, Including Missile Defense	41
18.	Comparison of Evolutionary and Transformational Alternatives: Defense Agency Investment, Including Missile Defense	42
19.	Past and Projected Resources for Missile Defense Investment	43
20.	Comparison of Evolutionary and Transformational Alternatives: Missile Defense Investment	44

Box

1.	Methods Used by CBO to Project Defense Investment Demands	22
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The Long-Term Implications of Current Defense Plans and Alternatives: Summary Update for Fiscal Year 2006

Summary and Introduction

Decisions about national defense that are made today—whether they involve weapon systems, military compensation, or numbers of personnel—can have long-lasting effects on the composition of U.S. armed forces and the budgetary resources needed to support them. In the past three years, the Congressional Budget Office (CBO) has published a series of reports projecting the resources that might be needed over the long term to carry out the plans in the Administration's then-current Future Years Defense Program (FYDP).¹

This paper, like CBO's previous reports, provides long-term projections (through 2024) of the costs of the Department of Defense's (DoD's) current plans—that is, the plans contained in the 2006 FYDP, which covers fiscal years 2006 through 2011 and reflects changes to the department's programs and priorities since February 2004.²

1. Those reports are *The Long-Term Implications of Current Defense Plans* (January 2003), *The Long-Term Implications of Current Defense Plans: Summary Update for Fiscal Year 2004* (July 2003), *The Long-Term Implications of Current Defense Plans: Detailed Update for Fiscal Year 2004* (February 2004), *The Long-Term Implications of Current Defense Plans: Summary Update for Fiscal Year 2005* (September 2004), and *The Long-Term Implications of Current Defense Plans: Detailed Update for Fiscal Year 2005* (September 2004). The detailed updates are in briefing format and are available only on CBO's Web site (www.cbo.gov).
2. DoD produces a FYDP each year and submits it to the Congress as part of the President's budget request. The FYDP is a database comprising a historical record of defense forces and spending as well as DoD's plans for future programs. The historical part of the FYDP shows costs, forces, and personnel levels since 1962. The plan portion presents DoD's program budgets (estimates of funding needs for the next five or six years based on the department's current plans for all of its programs).

In addition, the paper describes projections that CBO developed for two alternatives to DoD's current plans. Under CBO's "evolutionary" scenario, DoD would largely forgo acquiring new, advanced weapon systems and instead pursue evolutionary upgrades to its current capabilities. Under CBO's "transformational" scenario, DoD would emphasize to a greater extent than current plans do the acquisition of the advanced capabilities that DoD associates with military transformation (in the process forgoing selected programs that offer lesser advances and changing current plans for compensating military personnel). Both alternatives incorporate the assumption that the size of U.S. military forces will not change significantly relative to DoD's current plans.

The Defense Department's current plans encompass a mixture of evolutionary and transformational programs. The alternatives developed by CBO are not intended as specific spending paths. Instead, those stylized scenarios pursue either a more exclusively evolutionary or transformational approach as a way to illuminate various choices available to DoD as it develops its future plans. CBO's projections span the range of implications for resource demands and the modernization of U.S. military forces that are associated with those choices. In its analysis, CBO does not consider whether adopting an evolutionary or transformational approach will provide the military capabilities that may be needed to meet future threats, which are uncertain and subject to continual debate. Nor does it consider the changes in military tactics and operational plans that may be needed if current plans for acquiring new capabilities are changed.

The overall budgetary implications of DoD's current plans remain similar to those associated with CBO's pre-

vious projections: carrying out the plans in the FYDP would require sustaining annual defense funding over the long term at higher real (inflation-adjusted) levels than those that have occurred since the mid-1980s (if supplemental appropriations are excluded). Four factors account for the higher demand for defense resources that CBO foresees:

- Plans to increase purchases of new or more costly military equipment during the next several years and then to sustain that level of procurement over the longer term;
- Plans to develop and eventually produce as part of military transformation weapon systems that provide new capabilities—systems whose estimated costs are also increasing;
- The growing costs of pay and benefits for DoD's military and civilian personnel; and
- The increasing costs of operation and maintenance for aging equipment as well as for newer, more complex equipment.

In CBO's projection of DoD's current plans, the demand for defense resources averages about \$497 billion annually (in 2006 dollars) from 2012 to 2024, or about 18 percent more than the total obligational authority for defense requested by the Administration for 2006.³ Adding the potential risk of higher-than-anticipated costs raises the projected long-term demand for defense funding to an annual average of about \$563 billion through 2024, or 34 percent more than the Administration's 2006 request of about \$420 billion. CBO's analysis of cost risk included several possibilities: the costs of weapon systems now under development might exceed early estimates, as they have in the past; medical costs might rise more rapidly than has been projected; and DoD might continue to conduct military operations overseas—such as those on-

going in Iraq and Afghanistan—as part of the global war on terrorism.

The evolutionary and transformational alternatives developed by CBO explore whether it might be possible to reduce those long-term demands for defense resources by adopting different approaches to modernizing U.S. military forces.⁴ Under the evolutionary alternative, the average annual demand for defense resources over the 2012-2024 period would be \$443 billion, which is about 6 percent greater than the Administration's budget request for fiscal year 2006 but about 11 percent less than CBO's projection of the resources necessary to carry out DoD's current plans during the same period (see Figures 1 and 2 and Table 1 on page 5).⁵ Under the transformational alternative, the annual demand for defense resources would average \$458 billion, which is about 9 percent more than DoD's 2006 budget request but about 8 percent less than CBO's projection of the resource implications of DoD's

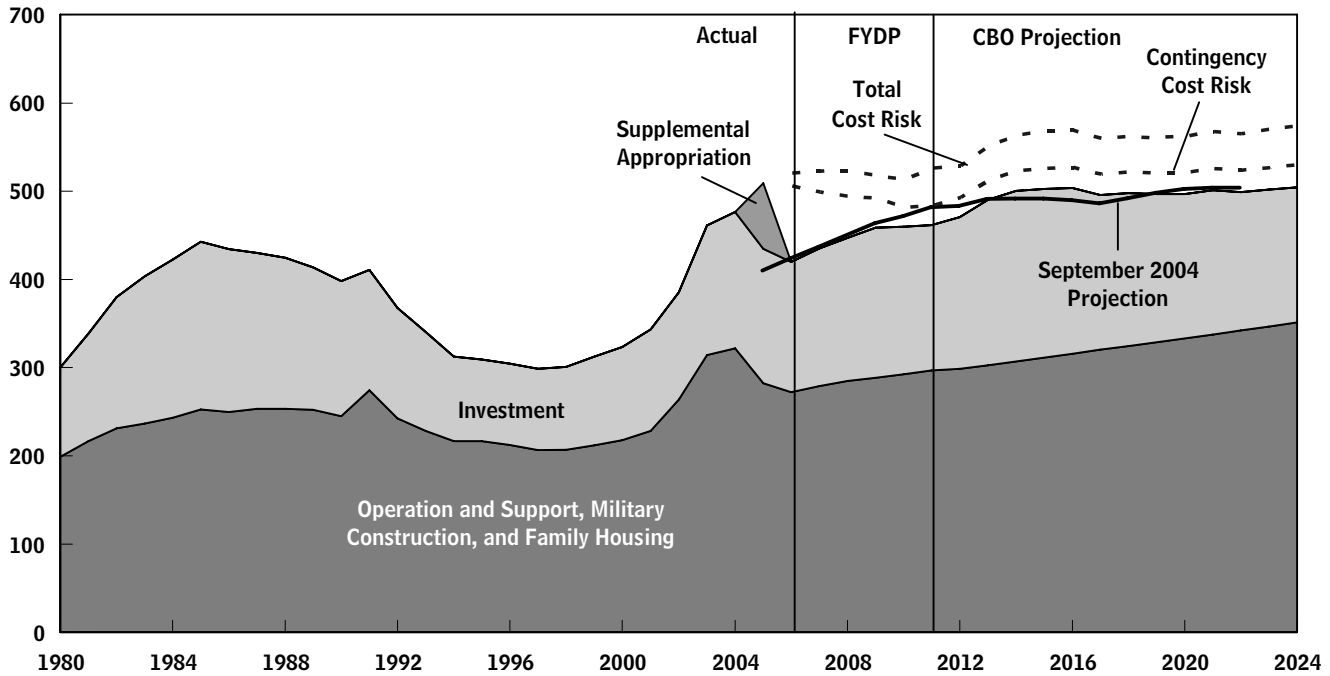
3. All FYDP funding is calculated as total obligational authority (TOA)—the funding available to be obligated by a federal agency or department. The bulk of that funding is budget authority, which is appropriated by the Congress; however, TOA also includes funding derived from receipts as well as other nonappropriated amounts. In most years, the difference between TOA and budget authority in subfunction 051 of the federal budget (which funds the Department of Defense) is about \$2 billion or less.

4. The particular programmatic choices incorporated in each alternative—including both types and numbers of weapon systems—are examples of the kinds of changes that might be made to current plans in light of the emphasis ascribed to each alternative. Many other choices are possible.

5. Since military operations began in Iraq and Afghanistan, DoD has not included funding to support those operations within the President's annual budget request, nor has such funding been included in the future years of any of the department's FYDPs. (The future years of the current FYDP cover 2006 through 2011.) Instead, funding has been provided through a combination of separately enacted emergency supplemental appropriations and action by the Congress to include in DoD's annual defense appropriation partial funding for those operations' anticipated continuation. Because CBO's projections for the 2012-2024 period are based on the FYDP, CBO includes the funding that might be needed to support continued operations in Iraq and Afghanistan in its estimates of cost risk rather than in its projections of the implications of the FYDP, which excludes such funding. Once funding for operations in Iraq and Afghanistan has been appropriated and obligated, however, it is included in the historical portion of the FYDP, which this year covers all funds appropriated through fiscal year 2004. (The 2006 FYDP was prepared when fiscal year 2005 was not even half completed.) The historical record of DoD's previous spending presented in the FYDP cannot be separated into regular and supplemental appropriations because the FYDP's structure provides no means to distinguish between the two types of appropriations. Consequently, CBO, in its illustrations for this report, explicitly displays only those supplemental appropriations that have been enacted by the Congress but not included in the current FYDP—that is, supplemental appropriations for fiscal year 2005 (see, for example, Figure 1).

Figure 1.**Past and Projected Resources for Defense**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program.

current plans. The majority of the savings under each alternative would accrue in the investment accounts rather than in the operation and support accounts because CBO assumes in all cases that the size of the United States' military forces would be largely unchanged.

The budgetary resources associated with adopting the transformational alternative are greater than those associated with the evolutionary alternative because DoD's current plans already incorporate many of the most expensive elements of transformation, such as the Army's Future Combat Systems program. In addition, the cost risk associated with the transformational alternative is greater than that associated with the evolutionary alternative in part because under the former case, DoD would pursue many new development programs, which history indicates have the greatest potential for cost growth. By contrast, under the evolutionary alternative, DoD would continue to procure many systems that are already in production and for which costs are relatively well known (see Table 1). As a way to give a sense of the actions that would be necessary for the transformational and evolutionary alternatives to have comparable resource demands

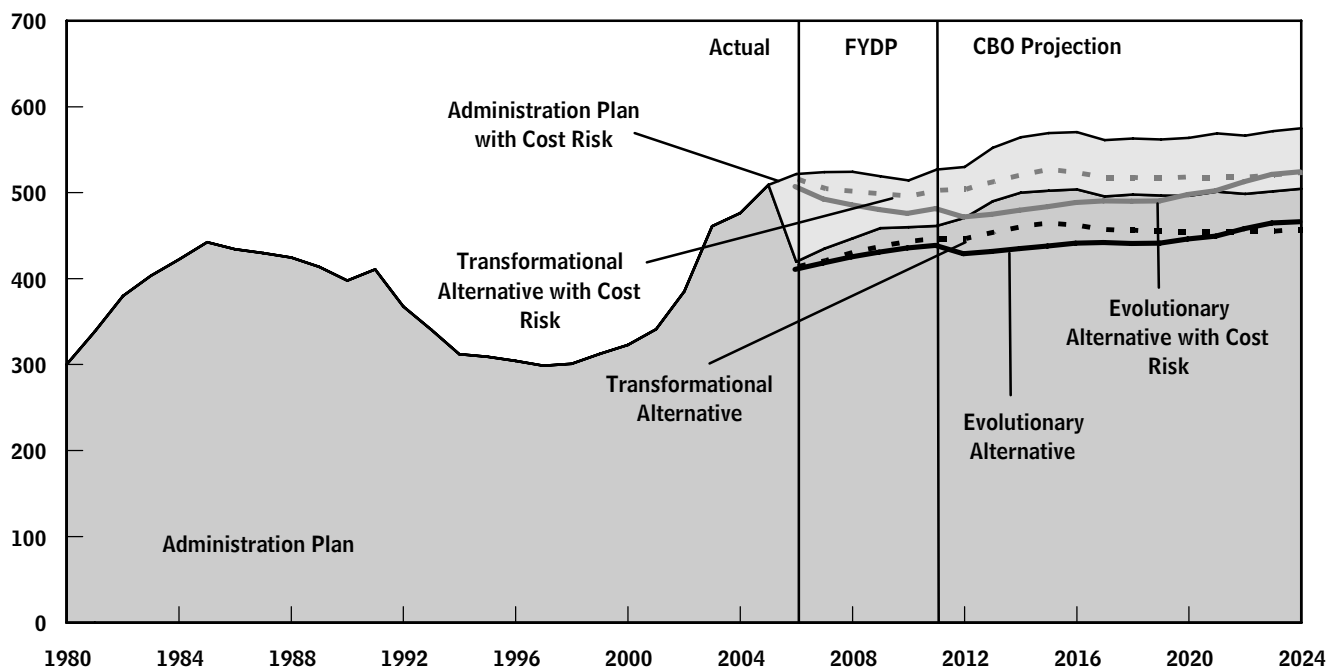
(excluding cost risk), the size of U.S. forces under the transformational alternative would have to be cut by about 4 percent, CBO estimates. Similarly, to bring CBO's projection of the Administration's current plans down to the level of the evolutionary alternative, forces would have to be cut by about 13 percent.

CBO's analysis indicates that DoD can achieve substantial savings relative to current defense budgets (excluding supplemental appropriations) only if it both significantly changes its future plans for modernization and reduces the size of today's military. Even with the major changes to DoD's plans that the evolutionary alternative would imply—that is, the forgoing of nearly all the advanced military capabilities that the department is currently pursuing—demands for defense resources over the long term would continue to grow somewhat by comparison with current budgets. As a result, in addition to adopting the changes associated with the evolutionary alternative, DoD would have to cut the size of U.S. forces by about 7 percent, CBO estimates, to ensure that future demands for defense funding were no greater than today's.

Figure 2.

Comparison of Evolutionary and Transformational Alternatives: All Defense Resources

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

Under DoD's current plans and CBO's two alternatives, the demand for defense resources in the future would remain lower than in the past in relation to the size of the economy. The share of U.S. gross domestic product (GDP) allocated to defense spending declined from an average of 6 percent in the 1980s to 4 percent in the 1990s. If DoD's current plans were carried out, defense spending would drop to 3.0 percent of GDP by 2011 and 2.4 percent by 2024 (see Figure 3 on page 8). Under both the evolutionary and transformational alternatives, defense spending would make up 2.2 percent of GDP by 2024, CBO projects.

Projections of Spending for Operation and Support, Military Construction, and Family Housing

The 2006 FYDP envisions that spending for operation and support (O&S) activities—running units, maintain-

ing equipment, and providing pay and benefits—will grow from \$259 billion in 2006 to \$284 billion in 2011 (see Figure 4 on page 9). (Those estimates translate into an average annual rate of real growth of 1.9 percent during the five-year period.) CBO projects that over the longer term, carrying out current plans would push O&S spending to \$341 billion in 2024 (again, starting from 2006, a 1.5 percent pace of annual real growth) or, if cost risk was included, to \$386 billion. O&S spending under CBO's evolutionary alternative would approximately equal O&S spending under DoD's current plans, CBO estimates. Under the transformational alternative, which would comprise changes in pay, medical benefits, and numbers of personnel, O&S spending would grow to \$317 billion in 2024, or to \$359 billion including cost risk. Between 2007 (the first year in which transformational O&S options would be implemented) and 2024, O&S resource demands (excluding cost risk) would be reduced under the transformational alternative by an

Table 1.

Key Features of CBO's Projections Through 2024 of Current and Alternative Defense Plans

Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Army Investment			
Army Aviation	Develop and buy the new Joint Heavy Lift Helicopter	Upgrade existing heavy lift helicopters	Develop and buy the new Joint Heavy Lift Helicopter
	Begin to develop a new Future Utility Rotorcraft	Upgrade existing utility helicopters	Develop and buy the new Future Utility Rotorcraft
	Upgrade existing Apache attack helicopters	Upgrade existing Apache attack helicopters	Rely on Future Combat Systems unmanned aerial vehicles
	Buy new Armed Reconnaissance Helicopter	Buy new Armed Reconnaissance Helicopter	Rely on Future Combat Systems unmanned aerial vehicles
Army Ground Combat Vehicles	Develop Future Combat Systems	Forgo Future Combat Systems and upgrade existing Abrams tanks and Bradley fighting vehicles	Develop Future Combat Systems
Army Trucks	Buy new and rebuilt versions of current truck models	Buy new and rebuilt versions of current truck models	Buy reduced numbers of current truck models and develop the Future Tactical Truck System
Navy and Marine Corps Investment			
Navy Aircraft Carriers	Maintain 11 large-deck nuclear-powered carriers	Maintain 10 large-deck carriers and buy conventionally powered replacements	Buy two small-deck nonnuclear carriers every six years (for an eventual force of 20 smaller carriers)
Navy and Marine Combat Aviation	Buy F/A-18E/F fighters, a version of the Joint Strike Fighter (JSF) for use on the Navy's large-deck carriers, and a short takeoff/vertical landing (STOVL) version of the JSF for Marine squadrons	Forgo the JSF and buy additional F/A-18E/F fighters for both Navy and Marine squadrons	Forgo the large-deck-carrier version of the JSF and buy all STOVL JSFs for use on light (small-deck) carriers

Continued

average of about 6 percent relative to CBO's projection of DoD's current plans.

For military construction and family housing, the FYDP envisions that total spending will increase from \$13 billion in 2006 to a peak of \$16 billion in 2008 and then return to \$12 billion annually in 2010 and 2011. The temporary increase in that budget results from funding to implement the details of the round of base realignments and closures (BRAC) to be decided early in fiscal year 2006. Spending for military construction and family

housing under CBO's projections of current plans would remain roughly constant between 2012 and 2024 at \$10 billion to \$11 billion a year in the absence of cost risk or \$12 billion to \$13 billion a year with cost risk. Those projections would not change under CBO's evolutionary and transformational alternatives.

Operation and Support

The O&S budget, which now accounts for about 60 percent of defense spending, is defined as the sum of appropriations for operation and maintenance (O&M), mili-

Table 1.

Continued

Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Navy and Marine Corps Investment (Continued)			
Navy Surface Combatants	Buy 26 large new destroyers and cruisers and 73 small littoral combat ships	Buy 22 upgraded existing-class destroyers and 70 small littoral combat ships	Buy 13 new large destroyers and cruisers and 42 small littoral combat ships
Navy Attack Submarines	Maintain 39 Virginia class nuclear-powered attack submarines	Maintain 33 Virginia class nuclear-powered attack submarines	Stop buying Virginia class boats in 2011 and buy smaller tango-bravo-type submarines thereafter ^b
Navy Amphibious Ships	Buy 17 new maritime pre-positioning ships to support sea basing and six large-deck and four other amphibious ships	Forgo sea basing; buy 15 cargo ships to support three conventional prepositioning squadrons; buy one large-deck and four other amphibious ships	Buy 10 new maritime pre-positioning ships to support one sea-basing squadron and five cargo ships to support one conventional prepositioning squadron; buy six large-deck amphibious ships
Marine Rotary Wing Aviation	Buy MV-22 tilt-rotor aircraft	Forgo MV-22 and buy conventional medium- and heavy-lift helicopters	Buy MV-22 tilt-rotor aircraft
Air Force Investment			
Air Force Tactical Combat Aviation	Buy F-22 fighters, JSFs, and unmanned combat air vehicles (UCAVs)	Forgo F-22 fighters, JSFs, and UCAVs and buy upgraded versions of existing F-15 and F-16 tactical fighters	Forgo F-22 fighters and buy additional JSFs and UCAVs
Air Force Medium- and Long-Range Strike	Pursue an intermediate-range "interim bomber"	Forgo the interim bomber and develop a new long-range heavy bomber	Pursue an intermediate-range "interim bomber"
	Retain the current service life of the F-117A fighter	Extend the service life of the F-117A fighter	Develop a long-range supersonic strike missile
Air Force Tankers	Buy a new tanker as a modified version of a commercial passenger aircraft and retire existing KC-135E and KC-135R tankers	Convert remaining KC-135E tankers to KC-135Rs	Buy a new tanker as a modified version of a commercial passenger aircraft and retire existing KC-135E and KC-135R tankers

Continued

tary personnel, and various revolving funds (see Figure 5 on page 10).⁶ The share of military personnel dollars in

the overall defense budget declined during the early 1980s, when a greater emphasis was placed on investment; it declined again during the late 1990s, when the force structure was reduced. CBO projects that beyond the period covered by the current FYDP, military personnel dollars as a share of all defense spending will increase, for reasons that will be discussed later. As a share of the defense budget, O&M spending also declined during the

6. The revolving funds generate revenues from fees charged to users within DoD but may also receive appropriations as part of the defense budget. Currently, such funds include the National Defense Sealift Fund, the Defense Working Capital Fund, and each military department's working capital fund.

Table 1.**Continued**

Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Missile Defenses			
Ground-Based Midcourse Defenses	Upgrade additional radars	Pursue no further upgrades to radars	Upgrade additional radars
	Deploy interceptors at at least one additional site	Deploy no additional interceptors	Deploy interceptors at at least one additional site
	Develop and deploy infrared sensors in space	Deploy no space-based sensors	Develop and deploy infrared sensors in space
Boost-Phase Defenses	Develop and deploy the Airborne Laser and ground-, sea-, and space-based interceptors	Pursue only research on various concepts	Develop and deploy the Airborne Laser and ground-, sea-, and space-based interceptors
Terminal Defenses	Develop and deploy eight THAAD fire units	Develop and deploy two THAAD fire units	Develop and deploy eight THAAD fire units
	Develop and deploy MEADS	Forgo MEADS	Develop and deploy MEADS
	Deploy PAC-3	Deploy PAC-3	Deploy PAC-3
Operation and Support			
Military Pay	Increase pay over the long term at the rate of growth of the employment cost index	Increase pay over the long term at the rate of growth of the employment cost index	Expand bonuses and special pays as partial substitutes for pay increases
Health Care	Retain current medical benefits for military dependents and retirees	Retain current medical benefits for military dependents and retirees	Increase copayments and deductibles for health care benefits provided to military dependents and retirees
Manpower	Use no sponsored reserves	Use no sponsored reserves	Introduce sponsored reserves
Average Annual Defense Resources, 2012-2024 (Billions of 2006 Dollars)			
Without Cost Risk	497	443	458
With Cost Risk	563	493	520

Source: Congressional Budget Office.

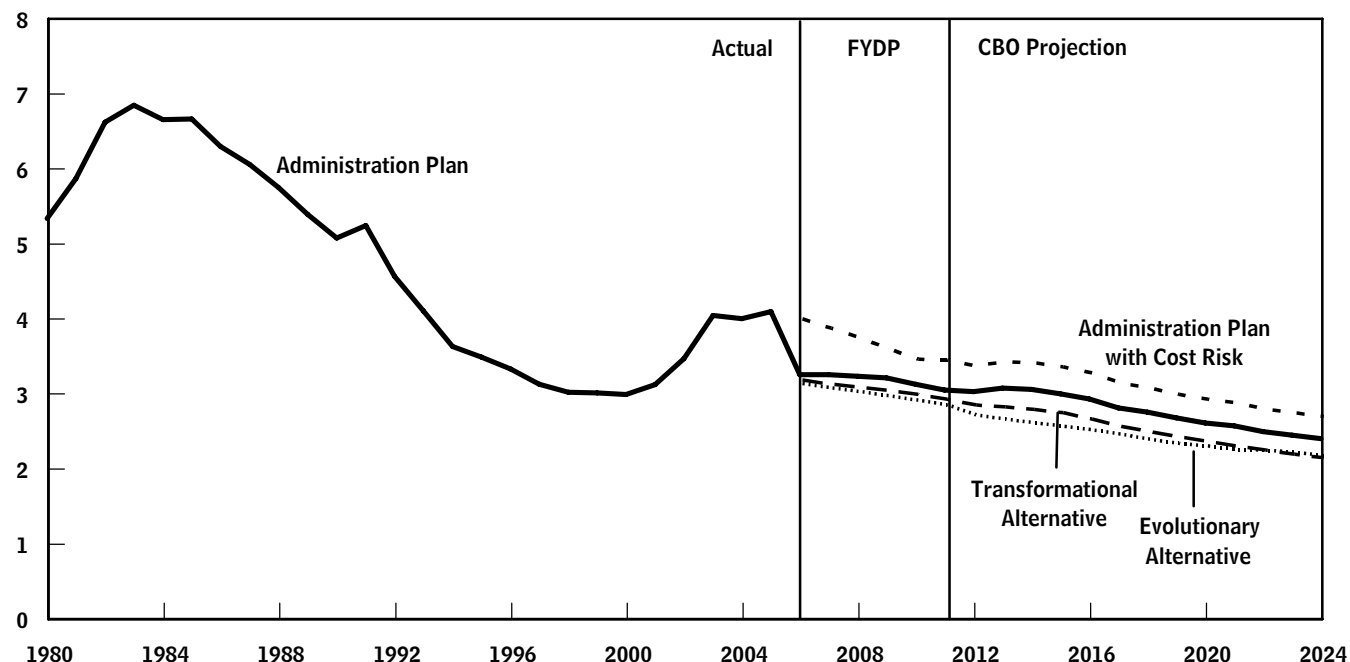
Notes: The projection categories in the table are not an exhaustive list of the programs considered in CBO's analysis.

THAAD = Terminal High Altitude Area Defense; MEADS = Medium Extended Air Defense System; PAC-3 = Patriot Advanced Capability-3.

- Current plans are those set out in the Future Years Defense Program. By comparison, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.
- Tango-bravo (short for "technology-breakthrough") submarines (which currently are only conceptual) would be smaller and less expensive than Virginia class submarines but nearly equivalent in capability.

Figure 3.**Defense Resources as a Percentage of GDP**

(Percent)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

early 1980s; however, CBO projects that it, too, will rise after 2011.

In CBO's estimation, most of the growth projected for O&S spending, if cost risk is excluded, will stem from personnel-related increases, such as rising real wages and increasing costs for medical benefits. For the purposes of its projections, CBO has broken down the O&S budget by functional category (see Figure 4). Funding for each such category includes resources from the O&M, military personnel, and, in some cases, the revolving-fund appropriations; those resources may also be associated with the three military departments—the Army, the Navy (including the Marine Corps), and the Air Force. The functional categories that CBO has adopted are based on force and infrastructure codes used by DoD's program analysts.⁷ Those categories are:

- *Operating forces*—military and support units assigned to combatant commands;

- *Medical*—medical personnel, military hospitals, purchased care, pharmaceuticals, and medical accrual charges;⁸

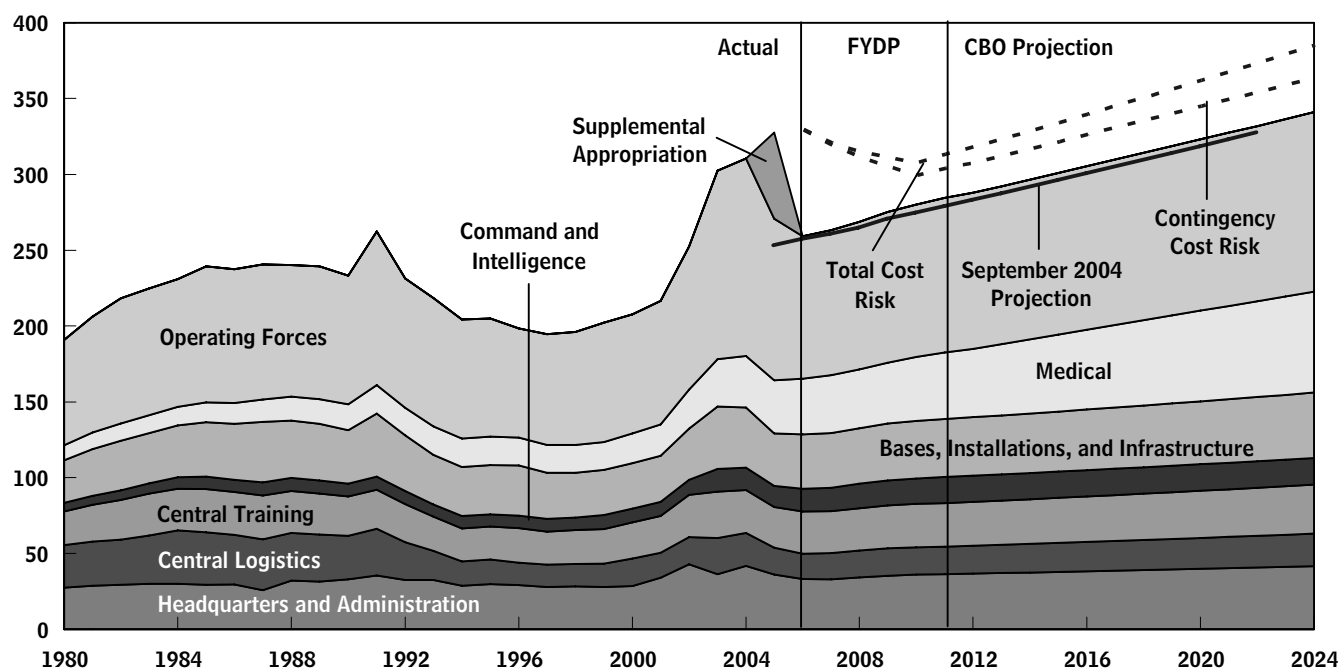
- *Bases, installations, and infrastructure*—installations for military forces, communications and information infrastructure, central benefit programs for DoD personnel, and miscellaneous activities;

7. The definitions that follow come from Institute for Defense Analyses, *DoD Force Infrastructure Categories: A FYDP-Based Conceptual Model of Department of Defense Programs and Resources* (Alexandria, Va.: Institute for Defense Analyses, 2002).

8. Medical accrual charges are payments to account for the future medical costs that current service members (as well as their eligible family members, widows, and widowers) will incur under the military's TRICARE For Life program once they retire and reach the age of eligibility for Medicare. Within the FYDP, medical accrual charges are distributed among all O&S functional categories. To provide a comprehensive estimate of DoD's medical costs, CBO consolidated all such charges in the medical category.

Figure 4.**Past and Projected Resources for Operation and Support**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program.

- *Command and intelligence*—operational headquarters, command-and-control systems, and intelligence collection;
- *Central training*—training at central locations away from service members' duty stations;
- *Central logistics*—depot-level maintenance, supplies, and transportation of materials; and
- *Headquarters and administration*—acquisition infrastructure, science and technology programs, central personnel administration, and departmental management.

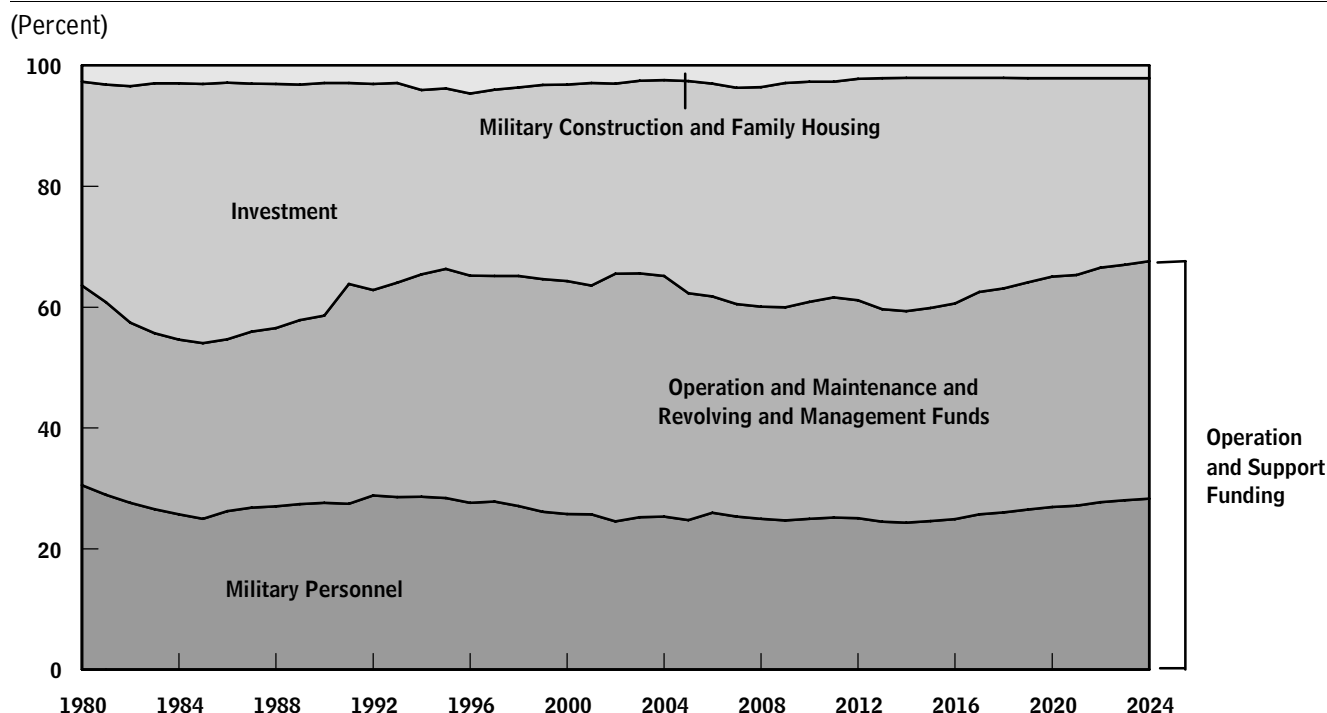
If the medical and operating forces categories were excluded, increases in military and civilian pay would account for the entire growth of costs in CBO's projections (excluding cost risk). DoD plans to raise pay for military personnel at a nominal rate of 3.1 percent in 2006 and 3.4 percent each year from 2007 to 2011.⁹ After that, CBO's projections incorporate the assumption that pay for military personnel will rise at the same rate as the em-

ployment cost index (ECI) for wages and salaries (a measure of compensation in the civilian economy). For civilian employees, DoD plans to raise pay each year from 2006 through 2011 at a nominal rate of 2.3 percent. In recent decades, civilian and military personnel have usually received equivalent percentage pay increases.¹⁰ Consequently, CBO projects that civilian pay will also rise after 2011 at the same rate as the ECI.¹¹ If all of those increases occurred, military and civilian pay would grow in real terms by 30 percent and 24 percent, respectively, between 2006 and 2024—because wages (as measured by

9. Memorandum from John P. Roth, Deputy Comptroller, Department of Defense, to the Secretaries of the Military Departments and others, "Inflation Guidance—Fiscal Year (FY) 2006 President's Budget," February 3, 2005.

10. Civilian personnel received the same percentage pay raise as military personnel in 24 of the past 30 years (1975 to 2005).

11. In calculating cost risk for O&S spending, CBO increased civilian pay raises to achieve parity with military pay raises during the FYDP period (2006 to 2011).

Figure 5.**Operation and Support as a Share of the Defense Budget**

the ECI) are projected to grow more rapidly than prices (as measured by the GDP deflator).¹²

Medical Spending. In the case of medical spending, pay increases for uniformed medical personnel account for less than 5 percent of the overall medical O&S growth that CBO is projecting. Various other expenses—most notably, accrual charges, pharmaceuticals, and purchased care and contracts—play a much larger role (see Figure 6).¹³ CBO estimates that by 2024 under current plans, DoD’s medical spending will grow by more than 80 percent in real terms, rising from \$37 billion in 2006 to \$66 billion (excluding cost risk, which is discussed later) and accounting for 37 percent of the growth projected for O&S spending over that period. Accrual payments make up more than 41 percent of the projected in-

crease in medical spending, growing at a nominal rate of 6.25 percent a year after 2006.¹⁴ By 2024, in CBO’s estimation, accrual charges will be 114 percent higher in real terms than they will be in 2006.

Most of the remaining medical spending growth arises from increased expenditures for pharmaceuticals and for

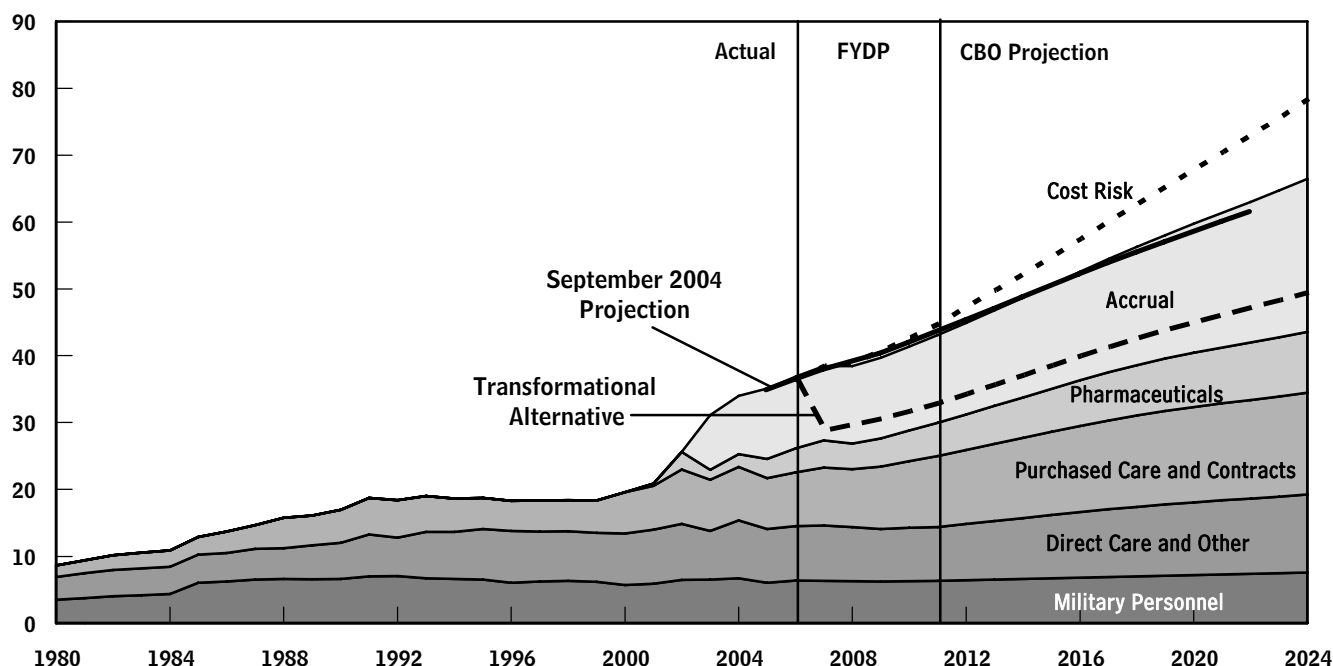
12. The ECI grew more rapidly than the GDP deflator (an index of overall prices) in each year of the period 1981 through 2005, and CBO projects that that pattern will continue between 2006 and 2024. Over the latter period, growth of the ECI will exceed growth of the GDP deflator by an average of 1.5 percent per year, CBO projects.

13. Pharmaceuticals include those dispensed by military medical treatment facilities, the military’s retail pharmacy network, non-network retail pharmacies, DoD’s mail-order pharmacy, and private-sector contractors. Purchased care and contracts include managed care support contracts, various types of purchased care, and supplemental care for active-duty personnel. In the past, that category also included pharmaceuticals; however, since 2001, DoD has been accounting for pharmaceuticals separately in the FYDP.

14. The DoD Medicare-Eligible Retiree Health Care Board of Actuaries annually updates its estimate of the growth in accrual charges necessary to fund the TRICARE For Life program, which is discussed later. For the past several years, the board has projected a nominal rate of growth of 6.25 percent, and CBO has adopted that estimate.

Figure 6.**Past and Projected Resources for the Military Medical System**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: CBO's "evolutionary" alternative is not shown because CBO assumed that under that scenario, military medical resources would not differ from those in the Administration's plan. By comparison, CBO's "transformational" alternative for projecting military medical resources includes several options designed to reduce resource demands.

FYDP = Future Years Defense Program.

purchased care and contracts under TRICARE.¹⁵ DoD anticipates that pharmaceutical spending per capita will rise at nominal rates that exceed 10 percent per year during most of the FYDP period.¹⁶ CBO projects nominal growth for 2012 of 9.0 percent, a pace that slows to about

5.5 percent annually by 2024. DoD expects that over most of the 2006-2011 period, per capita spending for purchased care and contracts will grow at nominal rates that range from 8 percent to 11 percent a year; CBO projects growth of 6.2 percent in 2012 that then falls to 4.5 percent a year by 2024. Those projections imply that DoD's total pharmaceutical spending will increase by 150 percent in real terms between 2006 and 2024 and that spending for purchased care will nearly double over the same period.¹⁷

15. TRICARE is the general term for military health care. TRICARE Prime is the health maintenance organization that DoD operates on behalf of non-active-duty beneficiaries and encompasses care delivered both at military medical treatment facilities (MTFs) and through a network of contract providers. TRICARE Prime requires that a beneficiary enroll either as an individual or as a family. Beneficiaries who do not enroll in TRICARE Prime may still receive care at MTFs but only to the extent that space is available. They may also use TRICARE Standard or TRICARE Extra, programs that reimburse a portion of medical expenses incurred by nonenrolled beneficiaries who receive care from civilian providers.

16. Although the 2006 FYDP anticipates a drop of more than 3 percent in per capita pharmaceutical spending from 2007 to 2008, DoD projects that for the other years that the FYDP covers, annual growth will range from 11 percent to 28 percent.

17. CBO based its estimates of the growth of spending for pharmaceuticals through 2014 on the pharmaceutical expenditure projections published by the Centers for Medicare and Medicaid Services (CMS)—available at www.cms.hhs.gov/statistics/nhe/projections-2004. For years after 2014, CBO assumed that growth would slow, declining eventually to a rate that was one percentage point higher than growth of per capita GDP in 2030. To estimate growth after 2011 of spending for medical care provided at MTFs and purchased from the private sector, CBO similarly extended CMS's projections of spending for hospital care and physician and clinical services.

DoD anticipates that among the remaining types of medical costs, total spending for direct care—that is, care provided in-house at the military’s medical treatment facilities (MTFs)—together with other medical expenses will fall from 2007 to 2009 but then increase, through 2011, by around 3 percent per year. CBO’s projections without cost risk incorporate the assumption that thereafter, such spending will grow at the same rate as that for hospital care and physician and clinical services in the private sector. Pay for uniformed medical personnel is projected to follow the same trend as that for other military personnel costs in DoD’s budget.

Spending for Operating Forces. The largest category of O&S spending comprises resources for operating forces. CBO projects that annual costs for that category will rise from \$102 billion in 2011 (excluding cost risk) to \$118 billion in 2024. About \$10 billion to \$11 billion of that growth reflects pay increases; the other \$6 billion results from three factors. First, operation and maintenance costs per active-duty member of the Army’s and Marine Corps’s ground forces (as well as the costs of the Army’s aviation programs) have been rising; CBO expects that trend to continue over the long term. Second, as weapon systems age, the cost of operating and maintaining them will increase.¹⁸ Third, new generations of weapon systems will be more complex and more expensive to operate and maintain than the systems they replace. CBO’s estimates of costs to operate Air Force, Navy, and Marine Corps fighters, bombers, and transport and tanker aircraft take the latter two effects into account.

New or Enhanced Benefits That Contribute to the Growth of Military Personnel Spending. Since 1999, policy-makers have provided a number of new or improved retirement and health care benefits for military retirees and their families that are paid for largely on an accrual basis.¹⁹ The four most expensive such benefits are the repeal of the REDUX retirement system, the establishment of TRICARE For Life, the elimination of the Social Security

offset for the military’s Survivor Benefit Plan (SBP), and changes in the rules regarding concurrent receipt of both military retired pay and veterans’ disability compensation. The increased accrual costs stemming from those benefits have added several billion dollars to military personnel spending each year, and such costs are expected to continue to grow in the future (see Figure 7). As a share of total military personnel spending, the benefits’ accrual charges and direct costs are projected to account for 12 percent in 2006 and grow to 18 percent by 2024. CBO estimates that during the 2006-2024 period, the growth of accrual and direct costs for those new benefits will account for 37 percent of the total growth of military personnel spending. Without those costs, the military’s personnel budget would be \$117 billion in 2024, in CBO’s estimation—or \$25 billion less than the projected budget that includes those costs.

The Repeal of REDUX. Before 1986, service members who retired after 20 years of service received an immediate annuity equal to 50 percent of their “high-three” basic pay.²⁰ (That 50 percent factor is called the multiplier.) The annuity increased with additional years of service but was capped at 75 percent of basic pay for members who retired after 30 or more years of service. The Military Retirement Reform Act of 1986 created the REDUX retirement system, which applied to all personnel who entered military service on or after August 1, 1986.²¹ Under REDUX, the multiplier would equal only 40 percent after 20 years of service but, again, would increase to 75 percent after 30 or more years.

Another change that the new system implemented was that REDUX offered only partial insulation from inflation rather than the full protection that the older high-three system provided. Specifically, through the age of 62, the annual cost-of-living adjustment (COLA) under REDUX would equal the annual percentage increase in the consumer price index (CPI) minus 1 percentage point. The annuity payment would be recomputed at age 62 so that the retiree would receive the same payment in that year that he or she would have received under the old (more generous) high-three system. Beyond age 62, how-

18. See Congressional Budget Office, *The Effects of Aging on the Costs of Operating and Maintaining Military Equipment* (August 2001). That study found that O&M spending for aircraft, after an adjustment for inflation, increases by 1 percent to 3 percent for every additional year of age.

19. Those accrual funds are managed similarly to the Medicare and Social Security trust funds. The Social Security funds are described in Congressional Budget Office, *Social Security: A Primer* (September 2001).

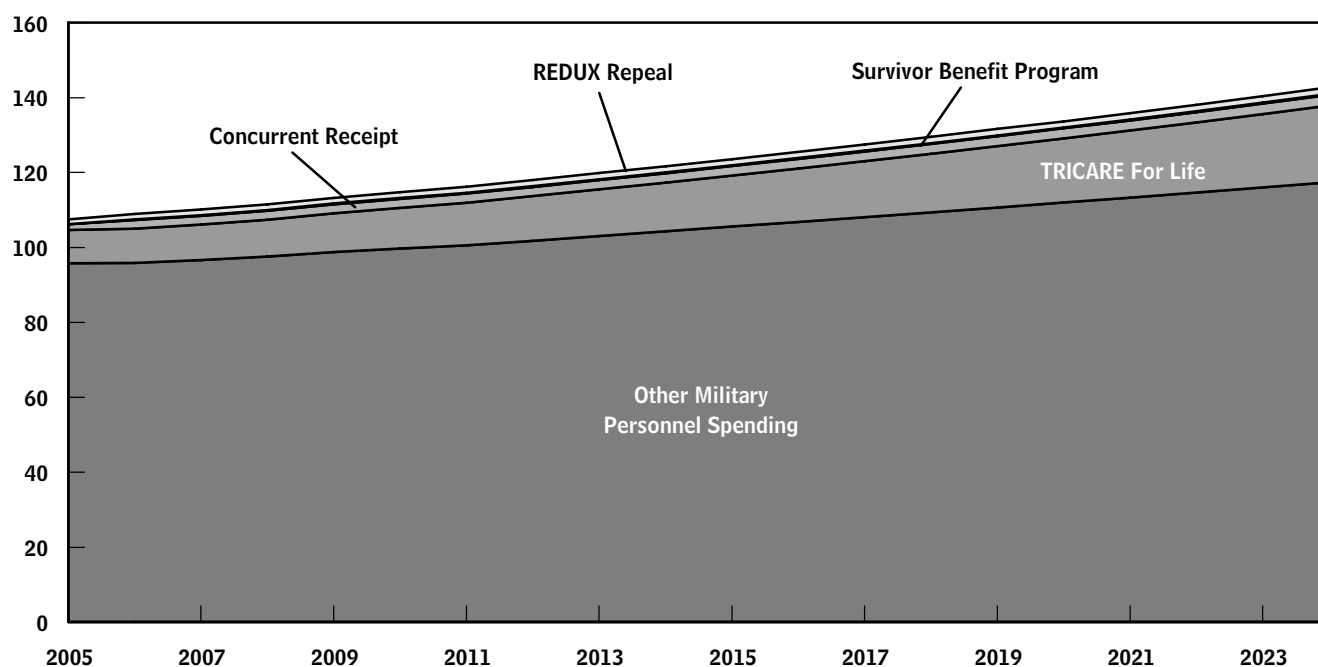
20. The basic pay that determines a service member’s retirement annuity is computed as the average of the 36 highest months of basic pay in a service member’s career—the “high-three” (-year) average.

21. 99th Congress, H.R. 4420, Public Law 99-348.

Figure 7.

Projected Cost of New Benefits Provided Since 1999 for Military Retirees and Their Families

(Billions of 2006 dollars)



Source: Congressional Budget Office.

ever, and for the remainder of the retiree's life, the retirement annuity would again be subject to a COLA equal to the CPI minus 1 percentage point.

The first cohort of service members to be affected by REDUX would have begun to retire in 2006. However, the 2000 Defense Authorization Act gave military personnel a choice between the high-three retirement system and an enhanced REDUX system.²² Service members who were anticipating retirement could elect during their 15th year of service either the high-three retirement plan or the (less generous) REDUX formula, which was now supplemented by a lump-sum payment of \$30,000 (to be received during their 15th year of service) called the Career Status Bonus. Either choice would increase DoD's retirement liability—in the former instance, as a result of the higher multiplier and COLA; in the latter case, as a result of the \$30,000 bonus. However, the higher multiplier and COLA would add to the amount that must be covered by the accrual charges, whereas the \$30,000 bo-

nus would be paid immediately out of the military personnel appropriation for the fiscal year in which the service member made his or her decision.

As a result, the total estimated cost of the REDUX repeal includes both projected spending for the Career Status Bonus and the increase in DoD's accrual charges as a result of the higher multiplier and COLA, weighted by the respective proportions of retirees who elect either the REDUX or the high-three retirement plan. Using data from the DoD Office of the Actuary, CBO estimates that those two costs combined will add \$1.4 billion to the military's personnel budget in 2006; in 2024, those costs will add \$1.8 billion.²³

TRICARE For Life. The introduction of this second new benefit expanded the health care coverage of Medicare-eligible military retirees and their families.²⁴ Before the

22. 106th Congress, S. 1059, Public Law 106-65, enacted October 1, 1999.

23. Personal communications to the Congressional Budget Office from the DoD Office of the Actuary, July 19 and 29, 2005.

24. 106th Congress, H.R. 4205, Public Law 106-398, enacted October 30, 2000.

implementation of TRICARE For Life (TFL), retirees and their families lost access to their TRICARE benefit once they became eligible for Medicare. However, they retained the right to obtain care at MTFs (on a space-available basis), including pharmaceuticals. Following the introduction of TFL, TRICARE became the second payer to Medicare. Thus, when Medicare-eligible military retirees or family members receive medical services that are covered by both Medicare and TRICARE, Medicare pays whatever portion of the service's cost is allowed under its rules, and TRICARE then pays most and in some cases all of the remaining Medicare deductibles and copayments. In addition, when those beneficiaries receive services that are covered by TRICARE but not by Medicare, TRICARE covers most of the costs (although beneficiaries may still be responsible for a small TRICARE deductible and some copayments). An additional component of the benefit is that under TFL, those beneficiaries can now purchase pharmaceuticals at retail pharmacies for a modest copayment.

TFL is funded on an accrual basis, with the accrual charges paid out of the military personnel appropriation and recorded in the Medicare-Eligible Retiree Health Care Fund.²⁵ The DoD Medicare-Eligible Retiree Health Care Board of Actuaries, an independent board that oversees the financial health of that fund, has estimated that those charges will grow in the foreseeable future at a nominal annual rate of 6.25 percent, and CBO has adopted that estimate. However, CBO subtracted from the annual accrual charges the portion of outlays from the fund that is projected to cover care that retirees receive at MTFs—because those outlays cover a benefit that was already in place before TFL's introduction in 2002. CBO projects that the accrual charges for the TFL benefit (excluding anticipated outlays for MTF care) will grow from \$9 billion in 2006 to \$21 billion in 2024.

Elimination of the Social Security Offset for the Survivor Benefit Plan. Military retirees can elect to pay a premium so that when they die, their surviving spouse will con-

tinue to receive a portion of their retirement pay. In the past, once that survivor reached the age of 62 and became eligible for Social Security benefits, payments under the SBP were reduced from 55 percent of the retirement pay that the service member would have received to 35 percent—a reduction intended to offset the survivor's income from Social Security. However, that offset is scheduled to be eliminated by April 1, 2008, as required in the National Defense Authorization Act for Fiscal Year 2005.²⁶ According to the projections of the DoD Office of the Actuary, the accrual charges needed to cover the enhanced benefit from eliminating the SBP offset will add \$192 million to military personnel spending in 2006, an amount that is projected to increase to \$237 million in 2024.²⁷

Changes in the Rules Regarding Concurrent Receipt. Until recently, the law required that the pay of a military retiree be reduced dollar for dollar by the amount of disability compensation that the retiree received from the Department of Veterans Affairs (VA). (Nevertheless, many eligible retirees chose to receive their VA disability compensation despite that required offset because such compensation is not subject to federal income tax.) The National Defense Authorization Act for Fiscal Year 2003 created a new benefit called combat-related special compensation, which in effect exempted certain seriously disabled retirees from the offset requirement.²⁸ The 2004 Defense Authorization Act introduced concurrent receipt for retirees who were at least 50 percent disabled, including those whose disability was not related to combat.²⁹ For all but the most severely disabled retirees, however, the amount of concurrent receipt is being phased in over a 10-year period from 2004 to 2013. The DoD Office of the Actuary projects that those new benefits will add \$2.3 billion to defense accrual charges in 2006; in 2024, those benefits will add \$2.8 billion.³⁰

25. As noted earlier, CBO grouped the TFL accrual charges paid from the military personnel appropriation and consolidated them in the medical category to illuminate the full cost of both current and future medical benefits. For this part of the analysis, however, CBO considered accrual charges for TFL as a component of the overall military personnel appropriation, with the objective of estimating how much TFL has added to the future funding requirements for that appropriation.

26. 108th Congress, H.R. 4200, Public Law 108-375, Sec. 644, enacted October 28, 2004.

27. Personal communications, DoD Office of the Actuary.

28. 107th Congress, H.R. 4546, Public Law (P.L.) 107-314, Sec. 636, enacted December 2, 2002, as amended by Sec. 642 of the National Defense Authorization Act for Fiscal Year 2004, H.R. 1588, P.L. 108-136, enacted November 24, 2003.

29. 108th Congress, H.R. 1588, P.L. 108-136, Sec. 641, enacted November 24, 2003.

30. Personal communications, DoD Office of the Actuary.

Evolutionary and Transformational Alternatives. CBO also projected O&S spending under the assumptions of its evolutionary and transformational alternatives to DoD's current plans. For the evolutionary case, CBO assumed that the policies or plans affecting O&S resource demands would not change. As a result, O&S costs projected under that alternative are nearly identical to O&S costs projected under DoD's plans. The differences include a small reduction under the evolutionary alternative in O&M expenses for aircraft (because of investment-driven changes in the fleet's age and composition) and a slight decrease in the number of shipboard Navy personnel. Those differences lead to estimated O&S savings under the evolutionary alternative of less than \$1 billion per year.

For the transformational alternative, CBO included in its projections several O&S options that were designed to reduce resource demands. Among those options were replacing some military personnel with a new labor category called sponsored reservists, substituting reenlistment bonuses for a portion of future pay raises, and raising copayments for participants in TRICARE For Life and TRICARE Prime. CBO also in this alternative incorporated assumptions about aircraft and ship fleets (detailed later in the discussion of investment) that generate a small amount of O&S savings. If all of those transformational options were combined, they would reduce O&S costs by \$10 billion in 2007 (the first year of implementation), CBO projects; by 2024, they would reduce the demand for resources by \$24 billion annually (see Figure 8).

The Sponsored-Reserve Program. A direct method of reducing O&S costs would be to decrease the number of active-duty personnel, a reduction that could be achieved by instituting a new sponsored-reserve program. That new category of labor would consist of personnel who worked for defense contractors during peacetime but, as members of the Individual Ready Reserve, agreed to be activated as part of the military when deployed to perform the same job overseas.³¹ Under CBO's transformational alternative, sponsored reservists would gradually replace—over an eight-year period, from 2007 to 2014—

a total of 40,000 active-duty military personnel in logistics, installation and facility management, physical security, and medical functions. However, those active-duty personnel could be replaced by a smaller number of sponsored reservists because sponsored reservists would not have to perform additional military-specific duties except when they were deployed. Annual savings from this option, in CBO's estimation, would grow from \$200 million in 2007 to \$1.6 billion in 2014 and each year thereafter.

Reenlistment Bonuses. Another option for reducing the expected growth of military personnel costs would be to substitute reenlistment bonuses for a portion of DoD's planned future pay raises. The Defense Department could expand its use of selective bonuses for service members in occupational specialties that have personnel shortages, an approach that would limit military pay raises to 2.0 percent from 2007 to 2009 but double the services' spending for bonus payments from 2007 to 2010.³² After 2009, annual pay raises would again be set to equal the percentage increase in the employment cost index. This option would mitigate the compounding effect of pay raises as well as the future cost of other benefits that are calibrated on the basis of salaries (such as retirement benefits). As a result, annual savings would grow from \$600 million in 2007 to \$3.5 billion in 2024, CBO projects.

TRICARE Copayments. As noted earlier, the growth of medical spending accounts for more than a third of the total projected rise in O&S expenditures from 2006 to 2024. Assessments that DoD has conducted show that, in many cases, utilization of services and spending per beneficiary are substantially higher among TRICARE beneficiaries than among their civilian counterparts.³³ That finding may be due to the fact that many non-active-duty TRICARE users face few out-of-pocket costs for their care. CBO examined two approaches to reducing medical spending by raising the out-of-pocket costs faced by those users to levels more on a par with those observed in the rest of the economy.

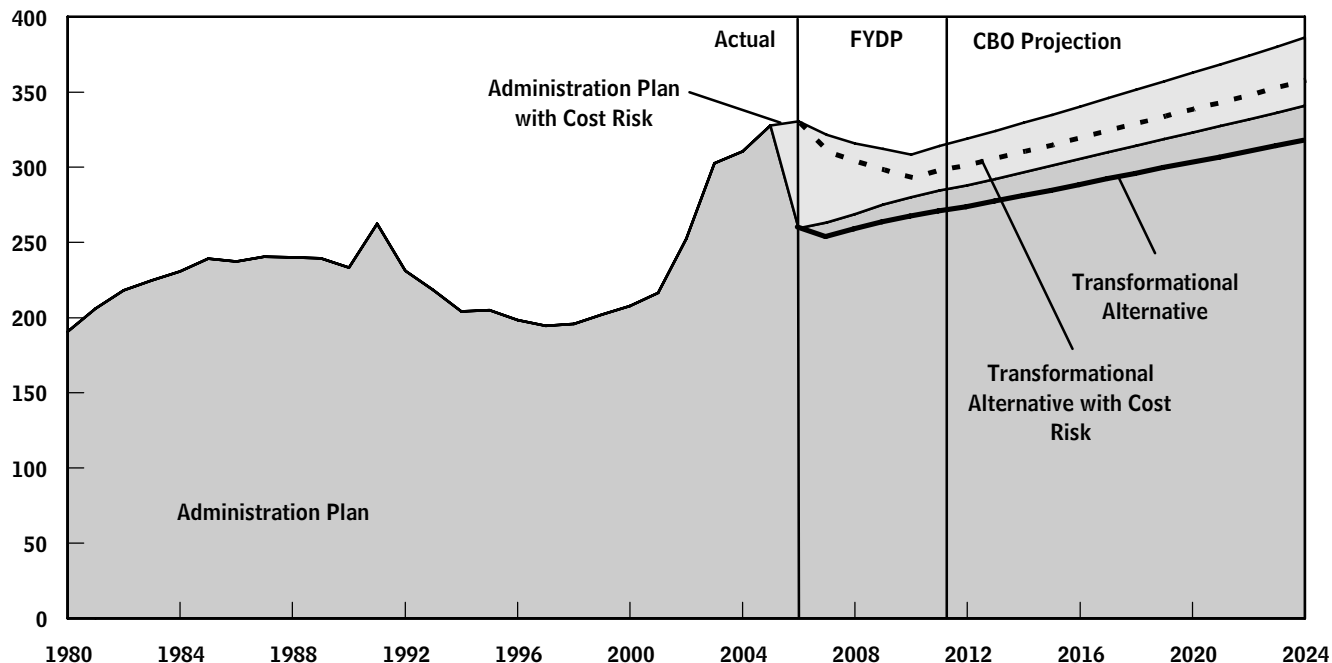
31. See Congressional Budget Office, *Budget Options* (February 2005), option 050-33, for additional details of the sponsored-reserve program. Sponsored reservists would differ from DoD's current dual-status civilians, or "military technicians"—federal civilian employees (not contractors) who serve with reserve or National Guard units.

32. See Congressional Budget Office, *Budget Options*, option 050-23. The military pay raise of 2 percent would slightly exceed the annual projected growth in the GDP deflator (1.8 percent) over the same period.

33. See Department of Defense, *Evaluation of the TRICARE Program: FY 2005 Report to Congress* (March 1, 2005), and *Evaluation of the TRICARE Program: FY 2004 Report to Congress* (March 1, 2004).

Figure 8.**The Transformational Alternative: Operation and Support**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: CBO's "transformational" alternative for projecting operation and support resources includes several options designed to reduce resource demands.

FYDP = Future Years Defense Program.

In considering the first approach, CBO examined the effect on DoD's medical spending of changes in TRICARE Prime that increased costs for families of active-duty service members and of younger retirees—those not yet eligible for Medicare. (Those two groups together account for 38 percent of DoD's medical spending, excluding accrual charges.) Specifically, for each group, CBO considered what would happen if individuals faced out-of-pocket costs equal to those paid by a civilian comparison group whose composition was adjusted to mimic the demographic characteristics of the TRICARE population.³⁴ Overall, that approach would reduce medical spending (excluding accrual charges) by 16 percent, CBO estimates.

For active-duty family members under the option, out-of-pocket costs (consisting of copayments and deductibles designed to reduce unnecessary utilization of medical services) would increase from about \$60 per family per year to about \$540. In CBO's estimation, that rise in costs would be expected to reduce the group's total medical expenditures (including both DoD's and the beneficiaries' shares of costs) by 16 percent.³⁵ Moreover, the revenues generated by those copayments would cover a larger proportion of total costs, resulting in 40 percent lower spending by DoD on medical care for this group. For younger retiree families, the second group, out-of-pocket costs would increase from about \$200 to about

34. See Department of Defense, *Evaluation of the TRICARE Program: FY 2005 Report to Congress*, p. 71. CBO did not change out-of-pocket spending for active-duty service members under this scenario.

35. To calculate that reduction, CBO used estimates of the price elasticity of demand for health care (the percentage decrease in demand in response to a 1 percent increase in out-of-pocket costs) drawn from the RAND Health Insurance Experiment. The pertinent results from the RAND study are reported in W. Manning and others, "Health Insurance and the Demand for Medicaid Care: Evidence from a Randomized Experiment," *American Economic Review*, vol. 77, no. 3 (June 1987), pp. 251-277.

\$1,000 per family per year. In turn, total medical expenditures for that group would decline by 14 percent, CBO estimates, and spending by DoD (after netting out co-payments, deductibles, and third-party reimbursements) would decline by 42 percent. The respective reductions of 40 percent and 42 percent, when applied to 38 percent of DoD's total medical spending, imply an overall reduction of 16 percent in that spending.

CBO also considered a second approach to lowering medical spending: reducing accrual charges by requiring TFL beneficiaries (Medicare-eligible military retirees, their eligible family members, widows, and widowers) to face out-of-pocket costs similar to those of their civilian counterparts. Currently, Medicare and TRICARE pay a large share of the medical costs for this group. TFL families incur average copayments and deductibles of just over \$900 per year; their civilian counterpart families, however, pay more than \$2,100 per year. Increasing the out-of-pocket costs paid by TRICARE For Life families to \$2,100 per year would reduce total medical expenditures for that group by 9 percent and total DoD spending associated with TFL users by 54 percent.³⁶

Together, those two changes in the TRICARE benefit would reduce DoD's medical resource demands by more than \$9 billion in 2007 and almost \$17 billion annually by 2024. Most of the savings in 2024 (more than \$12 billion) would come from reductions in accrual charges for active-duty service members and their families. DoD could save another \$4.6 billion by increasing copayments for active-duty families and younger retirees' families who were enrolled in TRICARE Prime.

Although the O&S category constitutes 60 percent of the defense budget, adopting all of the policy changes associated with the transformational alternative would reduce that budget by only 4 percent in 2007, CBO estimates. Annual savings would grow to 7 percent in 2024. To gain more substantial O&S savings in the future would re-

quire larger reductions in military end strength, pay raises, or other benefits.

Military Construction and Family Housing

The military construction budget pays for the planning, design, construction, and major restoration of military facilities and for the up-front costs associated with BRAC (for example, performing environmental assessments of sites designated for closure). Excluding the BRAC funding, that budget has ranged between \$3 billion and \$9 billion annually since 1980. DoD plans to dedicate enough funding to its facilities to achieve a recapitalization rate of 67 years. (The recapitalization rate is calculated by dividing the replacement value of all military facilities by the average funding used to restore or replace a portion of them annually.) In CBO's estimation, achieving that goal will require average annual funding of about \$8 billion.

The Administration's current plans for the 2006-2011 period include a total of \$16 billion of military construction funding for a 2005 BRAC round. An additional \$1 billion in such funding will be needed for BRAC purposes between 2012 and 2015, CBO estimates. DoD projects that six years into the implementation of the 2005 BRAC round, recurring annual savings will reach more than \$5 billion.³⁷ In CBO's projections, however, those savings do not reduce DoD's total budget. Instead, the projections incorporate the assumption that DoD will retain the budget authority for that money and use it for other purposes. (However, CBO could not determine specific uses on the basis of the information in the FYDP.)

The budget for family housing pays for the construction, operation, maintenance, and leasing of military family housing. Since 1980, that budget has ranged between \$3.3 billion and \$5.2 billion per year. The 2006 FYDP envisions that funding for family housing will drop from \$4.7 billion in 2006 to \$2.5 billion by 2011, because some military housing will be privatized. Privatization, however, while reducing DoD's spending to build and operate family housing, may also increase expenditures for the basic allowance for housing that military person-

36. To develop its estimates, CBO again used price elasticities from the RAND Health Insurance Experiment. TRICARE For Life provides substantial coverage for pharmaceuticals; under CBO's assumptions, very few TFL beneficiaries are expected to enroll in the Medicare Part D pharmaceutical benefit when it becomes available in 2006. CBO thus anticipates that TFL will continue to pay a large share of the pharmaceutical costs of Medicare-eligible military retirees and their families.

37. Department of Defense, *Base Realignment and Closure Report*, vol. 1 (May 2005), p. 4. The BRAC Commission, however, estimates that recurring annual savings from implementing its recommendations will be about \$4.2 billion.

nel receive to pay for the rental of private housing units.³⁸

CBO's projections of the military construction and family housing budgets do not change under the assumptions of the evolutionary and transformational alternatives.

Cost Risks for Operation and Support, Military Construction, and Family Housing

In its projections of cost risk, CBO analyzed the potential effects of changes in a number of the assumptions incorporated in the 2006 FYDP. If all of those changes were made, spending for O&S would total \$386 billion in 2024, or 13 percent more than CBO's estimate without cost risk. Spending for military construction and family housing in 2024 would reach about \$13 billion per year, an increase of 20 percent over CBO's non-cost-risk estimate.

Contingency Cost Risk. Much of the cost risk for O&S spending is associated with funding for ongoing operations in Iraq and Afghanistan as well as for other military efforts in the global war on terrorism. Neither the 2006 FYDP nor CBO's projections without cost risk reflect future funding for contingency operations. In its projections for O&S spending that include cost risk, CBO assumed that activities in Iraq, Afghanistan, and elsewhere might cost as much as \$71 billion in 2006.³⁹ That figure rests on the assumption that force levels in Iraq and Afghanistan will remain at their current levels throughout 2006—an assumption consistent with CBO's understanding of DoD's current plans for both operations.⁴⁰

CBO projects that over the long term, O&S cost risk associated with those (or similar) operations could decline

to about \$22 billion annually. That estimate is based on the assumption that between 2007 and 2010, the number of U.S. military personnel deployed in contingency operations will fall to about 50,000 and remain steady at that level through 2024. Of course, that kind of specific assumption is unlikely to hold true for the entire projection period. CBO's estimate of average annual funding of \$22 billion is simply a proxy for the budgetary impact of the U.S. military's continued engagement in such operations, wherever they might occur. If U.S. foreign policy shifted in a way that increased or decreased the nation's military presence overseas, costs would change accordingly.

Medical Cost Risk. Aside from contingency operations, the next-largest possible source of additional growth in O&S costs is the military medical system. CBO incorporated three types of cost risk in its medical projections. The first was the risk that per capita spending for pharmaceuticals would grow more quickly than anticipated. Before considering cost risk, CBO used DoD's estimates from the FYDP, which included a decline in pharmaceutical spending per capita for 2008. By contrast, in its projections incorporating cost risk, CBO assumed that pharmaceutical spending would rise between 2007 and 2008 by 10.2 percent, with annual growth falling to 9.3 percent by 2011.⁴¹ For years beyond those covered by the FYDP, CBO's projections with cost risk incorporate nominal growth that is 30 percent higher than that in the projections without cost risk: that is, growth of 11.7 percent per year in 2012 that then slows to 7.2 percent annually by 2024 (rather than 9.0 percent and 5.5 percent, respectively).⁴² Under those assumptions, DoD's total spending for pharmaceuticals from 2006 to 2024 would increase by 250 percent (rather than 150 percent) in real terms.

38. Housing allowance costs are not included in the family housing budget but appear among military personnel costs in the O&S budget. CBO's projection of overall military personnel costs beyond 2011 implicitly incorporates changes in the basic allowance for housing to reflect changes in the 2006 FYDP.

39. That estimate includes funding for operation and maintenance, military personnel, and coalition support as well as some (relatively small) miscellaneous contingency costs. Some supplemental funding also goes toward purchasing equipment; those costs are included under investment, which is discussed later.

40. See Congressional Budget Office, *An Alternative Budget Path Assuming Continued Spending for Military Operations in Iraq and Afghanistan and in Support of the Global War on Terrorism* (February 2005).

41. CMS has projected those same growth rates for pharmaceutical spending in the economy as a whole for those years. See www.cms.hhs.gov/statistics/nhe/projections-2004.

42. CBO examined 10-year projections of medical cost growth developed by the Department of Health and Human Services in the late 1980s and early 1990s. The projections ranged from 45 percent below actual growth to 65 percent above. However, CBO's projections cover a longer period (the 18 years from 2006 to 2024), and during such a span, it is unlikely that the most extreme rates of growth can be sustained. Thus, CBO trimmed the range of growth rates it used (to plus or minus 30 percent) relative to its projections without cost risk. For additional information on the method CBO uses to project growth in military medical spending, see Congressional Budget Office, *Growth in Medical Spending by the Department of Defense* (September 2003).

The second assumption that CBO incorporated in its cost-risk projections was that spending for purchased care and contracts would also grow 30 percent faster than anticipated. The current FYDP envisions that per capita spending for such care will increase at a nominal rate of between 8 percent and 11 percent during most years from 2006 to 2011 (although DoD projects growth of only 3.1 percent in 2008). In CBO's projections without cost risk, the growth rate drops to 6.2 percent by 2012 and to 4.5 percent by 2024. By comparison, CBO's cost-risk projections use growth rates that fall from 8.0 percent in 2012 to 5.8 percent—in which case by 2024, real spending for purchased care and contracts would grow by 130 percent (as compared with 90 percent without cost risk).

CBO's third cost-risk assumption involved the growth of per capita spending for direct care and other medical expenses. As noted earlier, DoD's estimates in the 2006 FYDP imply that such spending for care provided at MTFs will show little growth during the 2006-2011 period. For its projections with cost risk, CBO instead used the DoD comptroller's guidance on annual rates of cost growth for such spending: 6.6 percent for 2006 and 6.7 percent for 2007 through 2011.⁴³ CBO applied those rates to resource demands during the years covered by the FYDP and assumed that per capita spending for direct care would continue to grow at a nominal rate of 6.7 percent annually through 2024—rather than at the rates CBO projects for hospital care and clinical services in the private sector. (Those rates range from nominal growth of 6.2 percent in 2012 to 4.5 percent in 2024.) Under those assumptions, by 2024, DoD's direct costs and other medical expenses would have grown in real terms by 110 percent (as compared with 40 percent in the projections without cost risk).

CBO did not project the resource demands associated with faster growth in accrual payments to fund the medical benefits of military retirees over the age of 65. Those payments are currently growing at a nominal annual rate of 6.25 percent, which reflects the best estimate by the DoD Medicare-Eligible Retiree Health Care Board of Actuaries of the ultimate rate of growth of spending for that group's health care.

Other Cost Risks. Another source of cost risk is the possibility that the current temporary increase in the size of the Army will become permanent. The Secretary of Defense has given the Army authority through 2007 to add 30,000 soldiers, thus increasing its authorized end strength from 482,400 to 512,400 active-duty personnel. DoD currently plans to pay for those additional 30,000 soldiers by using supplemental appropriations; consequently, through 2007, CBO's projections include the cost of those soldiers as a contingency cost risk. CBO assumes that after 2007, the increase in end strength will be scaled down along with the extent of operations and that by 2010, the Army will return to its previous limit of 482,400 military personnel. To account for the possibility that the increase will not be temporary, however, CBO's estimate of other O&S cost risk incorporates the assumption that the size of the Army will remain at 512,400 soldiers, with added annual costs of more than \$3 billion.⁴⁴

CBO's estimates of other cost risks also include the possibility that civilian pay raises will mirror military pay raises, as has historically been the case. Under DoD's current plans, the annual pay raise for civilians would be about 1 percentage point less than the pay raise for service members. Making the raises equivalent in percentage terms from 2006 to 2011 would add \$400 million of cost risk in 2006, growing to \$5.8 billion annually by 2024. (Although CBO projects that after 2011, military and civilian pay will rise by equal annual percentage increases, the difference in cumulative increases through that year compounds in later years, and CBO thus includes it as part of cost risk.)

Finally, CBO's cost-risk projections incorporate the possibility that privatization will not reduce the budget for military family housing as DoD expects. Should family housing costs remain at their 1980-2005 annual average level, CBO projects that an additional \$1 billion to \$2 billion in annual resources will be needed beginning in 2007.

Projections of Spending for Investment

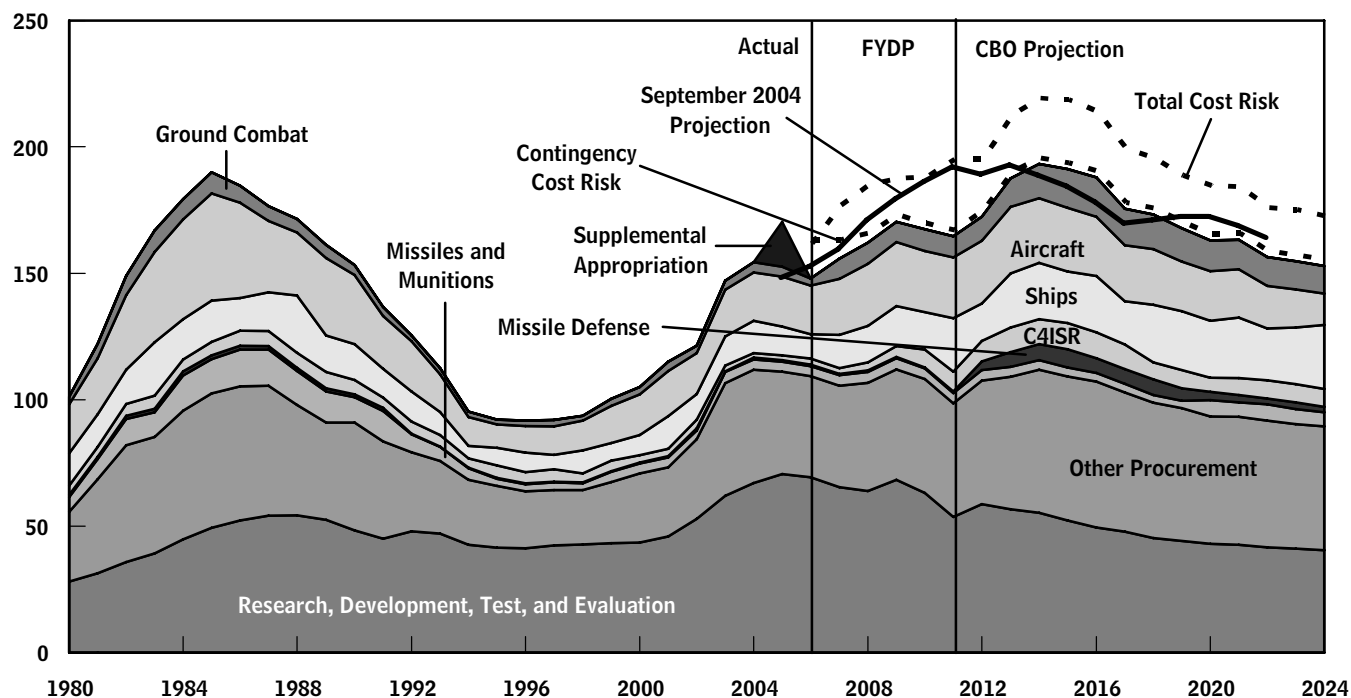
The Administration's current FYDP envisions that over the 2006-2011 period, investment spending—which pays for developing, testing, and buying weapon systems

43. Memorandum from John P. Roth, Deputy Comptroller, Department of Defense, February 3, 2005.

44. CBO assumed that the Army would achieve its higher end-strength goals despite its current recruiting challenges.

Figure 9.**Past and Projected Resources for Investment**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program; C4ISR = command, control, communications, computers, intelligence, surveillance, and reconnaissance.

and other equipment—will rise at an average annual rate of 2.3 percent, from \$148 billion in 2006 to \$165 billion in 2011 (see Figures 9 and 10).⁴⁵ Carrying out current plans over the long term would cause investment spending—excluding cost risk—to peak at \$193 billion in 2014, CBO projects.

45. Relative to last year's FYDP, the Defense Department has reduced its anticipated investment spending for 2008 and 2009. Its projections of investment funding for 2010 and 2011 are also lower in this year's FYDP than in CBO's September 2004 projections. The 2005 FYDP spanned the period from 2005 to 2009, adhering to fiscal controls determined by the Secretary of Defense for those years. There were no fiscal controls for 2010 and 2011, however, and many of DoD's programs envisioned increased investment in those years. Under the current FYDP, 2010 and 2011 are subject to the department's fiscal controls, and a number of programs have scaled back previous plans for increased spending in those years, deferring them to later years not now subject to fiscal control. As a result, CBO's previous projections of the resource demands for those years are now higher than DoD's.

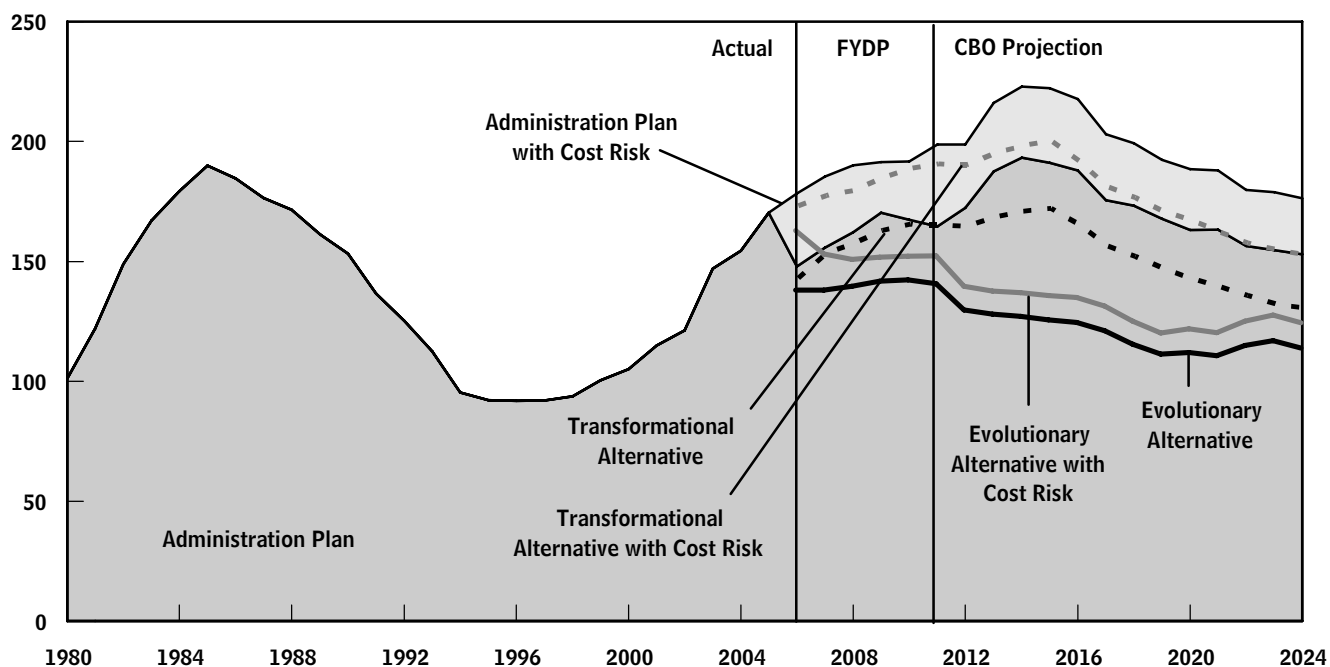
If cost risk was included, spending would peak, in 2014, at \$223 billion. (Box 1 discusses CBO's methods for projecting investment.) Funding for investment over the 2006-2024 period would average \$169 billion annually.

Under the evolutionary alternative, resource demands for investment during that period would average about \$125 billion without cost risk, CBO estimates, and \$137 billion with it, for a reduction of about 26 percent relative to CBO's projection of the implications of current plans.⁴⁶ Investment cost risk under the evolutionary alternative would be less than 30 percent of the risk associ-

46. Under CBO's evolutionary alternative, DoD would buy new equipment at rates comparable with those associated with its current plans. However, because the systems DoD would procure under that scenario would be less expensive overall, investment demands would be substantially less. That circumstance suggests the possibility of a modified evolutionary alternative under which new equipment would be bought at rates higher than DoD now plans but under which savings would nonetheless accrue.

Figure 10.**Comparison of Evolutionary and Transformational Alternatives: All Defense Investment**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

ated with current plans, in CBO's estimation, in part because the alternative incorporates the assumption that DoD will purchase upgraded versions of systems that are currently being produced and for which costs can be more accurately estimated. Under the transformational alternative, funding for investment would decline by about 8 percent relative to such funding under current plans. The reduction in resource demands under this alternative would be less than under the evolutionary alternative because DoD's current plans already fund many of the investment programs that the transformational scenario envisions.

Army Investment

Although the Army's investment strategy, as outlined in the 2006 FYDP, is primarily transformational, it does include funds to upgrade some of the Army's existing equipment. The Army's emphasis on transformation is re-

flected in the Future Combat Systems (FCS) program, which accounts for \$164 billion (or roughly one-quarter) of the Army's total investment funding from 2006 to 2024. To a lesser extent, the Army's investment program would also follow an evolutionary approach by modernizing several existing weapon systems, including the Apache, Blackhawk, and Chinook helicopters; the Multiple Launch Rocket System (MLRS) launcher; and the Patriot air and missile defense system. CBO projects that funding for those modernization programs from 2006 through 2024 will total slightly more than \$105 billion.

Under the evolutionary alternative, the Army would not attempt to transform its equipment but instead would retain its current systems, upgrading them to keep pace with evolving technology. It would eschew programs such as FCS and require much less funding for procurement and research and development than it would under the more transformational approach of the 2006 FYDP—

Box 1.**Methods Used by CBO to Project Defense Investment Demands**

The Congressional Budget Office (CBO) uses several different methods to project the military's requirements for investment resources.

Major Investment Programs

CBO projects long-term resource demands for major weapon systems on an individual basis, using, as appropriate, the Administration's long-range program plans (which may include development schedules, quantities to be purchased, and rates of annual purchases). That information is drawn from several documents. The Future Years Defense Program (FYDP) provides details about a broad spectrum of programs—in the current FYDP, through 2011. In addition, the Department of Defense (DoD) prepares backup books for Congressional committee staff for each of the accounts in the procurement title of the defense appropriation act and descriptive summaries for accounts in the title covering research, development, test, and evaluation (RDT&E) activities. Those reports provide additional detail at the appropriation and account level and, for some programs, include summaries of plans for periods beyond that covered by the FYDP. For an even smaller number of programs (including, for example, the Army's Future Combat Systems), DoD provides Selected Acquisition Reports (SARs), which contain the department's projections of development schedules, rates and quantities of purchases, and costs throughout a program's duration.

In preparing its projections, if CBO found that data for a major investment program were lacking (which was the case for a number of the components of its evolutionary and transformational alternatives), CBO developed its own estimates. For example, it developed estimates for the modernization of the Army's existing combat vehicles included in the evo-

lutionary alternative by using the costs incurred in the past for major upgrades to Abrams tanks and Bradley fighting vehicles.

Other Investment

Procurement funding in CBO's "other procurement" category pays for purchases of such items as artillery rounds, radios, passenger vehicles, and spare parts. About one-third of RDT&E funding pays for basic and applied research, development of advanced technologies, management activities in support of development, and some lower-cost programs to develop modifications to systems already being used in the field. Because DoD provides no detailed plans for those items and activities, CBO projects their long-term resource demands on the basis of trends in their funding since 1980 and the relationship between that funding and spending for major programs. Through those relationships, CBO captures funding for some highly classified (or "black") programs.

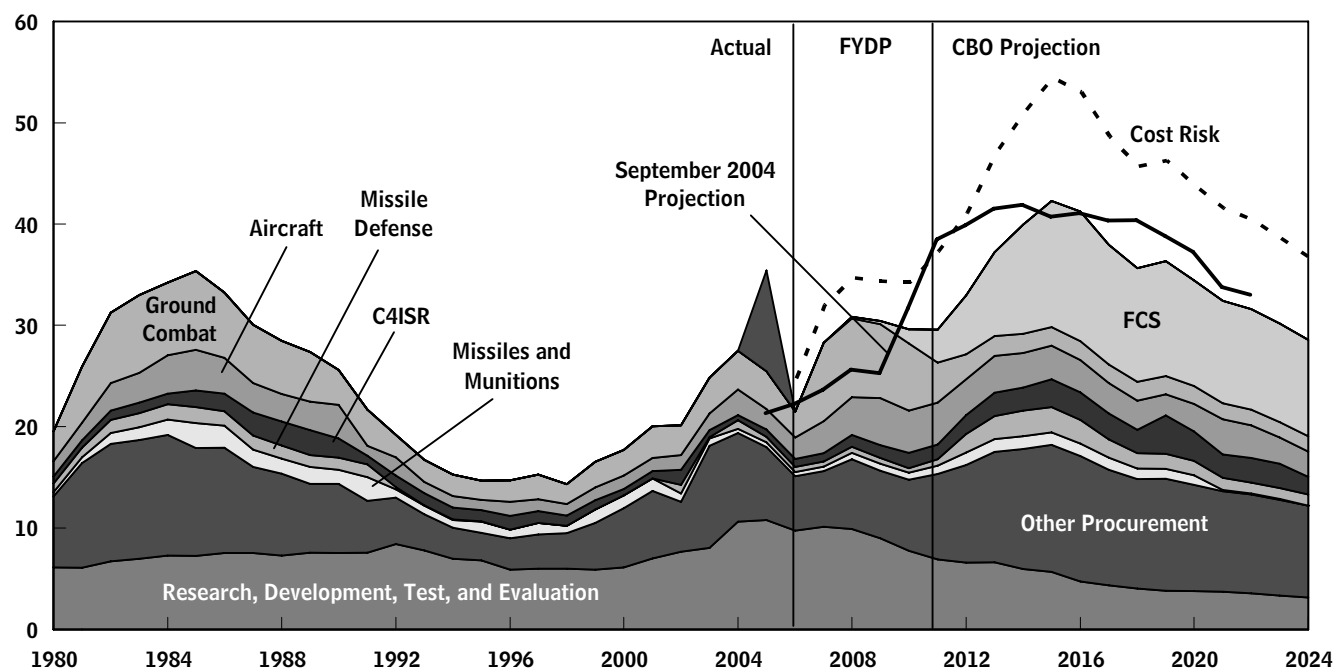
Cost Risk

In the past, DoD has often underestimated the cost to develop and purchase a new weapon system. Consequently, CBO also projects the demand for defense investment resources under the assumption that future costs will exceed early estimates to the degree that they have in the past. Those projections are based largely on information from RAND analyses of the cost growth that has occurred since 1969 for all major programs for which, through 2002, DoD had submitted SARs to the Congress.¹

1. For a more detailed discussion of how CBO develops cost-risk projections for investment, see Congressional Budget Office, *The Long-Term Implications of Current Defense Plans* (January 2003), pp. 44-46.

Figure 11.**Past and Projected Resources for Army Investment**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program; C4ISR = command, control, communications, computers, intelligence, surveillance, and reconnaissance; FCS = Future Combat Systems.

\$412 billion from 2006 to 2024, compared with \$631 billion (without taking cost risk into account).

Under CBO's transformational alternative, the Army would emphasize transformational programs in place of programs that upgraded existing systems or purchased equipment based on current technologies. As with the 2006 FYDP, the centerpiece of CBO's transformational alternative would be the FCS program, but in this instance the Army would not invest significant funds to maintain its current systems. Under CBO's transformational alternative, the Army would require \$615 billion in investment funding from 2006 through 2024, or nearly as much as CBO's projection of the cost implications of Army investment under the 2006 FYDP (see Figures 11 and 12 and Table 2).

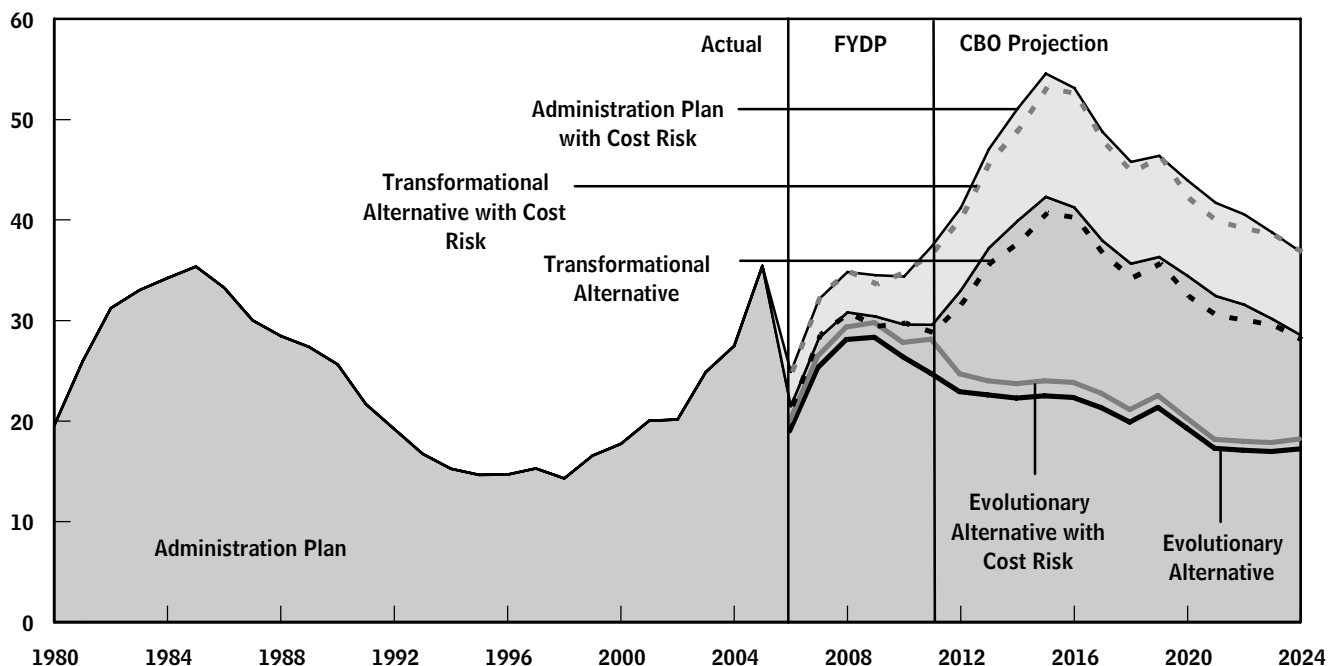
The Future Combat Systems Program. The FCS program is designed to transform the Army's combat equipment; under it, the Army would develop and purchase 18 new combat systems. Specifically, the Army would develop

eight new ground combat vehicles, including a new cannon to replace the Army's current M109 Paladin self-propelled howitzer; a new mounted combat system to replace the Army's current Abrams tank; a new infantry vehicle to replace the Bradley fighting vehicle; and five other vehicles—including a reconnaissance and surveillance vehicle, a medical vehicle, a mortar vehicle, and a command-and-control vehicle—that are designed to replace many of the Army's existing armored personnel carriers. The Army intends all of those vehicles to share a common chassis and engine and to be much lighter than the Abrams tank, which would make them easier to transport. In addition, the FCS program would develop four classes of unmanned aerial vehicles (UAVs) of varying range (to provide constant reconnaissance and observation of the battlefield) as well as several unmanned ground vehicles to transport equipment, destroy mines, and reconnoiter subterranean and interior locations. Also part of the Army's development strategy would be a new rocket launcher and advanced munitions for use with it.

Figure 12.

Comparison of Evolutionary and Transformational Alternatives: Army Investment

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

Of the total \$164 billion planned for investment in the FCS program from 2006 through 2024, about half would be needed to develop and purchase equipment for the first 15 brigades—a phase known as Increment 1. The remainder of the funding would support continued development and would equip an additional 13 brigades with FCS. Although DoD is scheduled to purchase FCS equipment for the first brigade in 2010, it is not slated to provide the full complement of systems—including all eight types of manned vehicles—to the first brigade until 2015. If the program is carried out as currently outlined in the 2006 FYDP—that is, by purchasing two brigades' worth of equipment annually starting in 2012—then 26 brigades, or roughly half of the active Army, could be equipped with FCS by 2024.⁴⁷

CBO's alternative investment scenarios differ in their treatment of the FCS program. Under the evolutionary alternative, the Army would cancel the FCS program in 2006. Under the transformational alternative, the Army would retain the program as outlined in the 2006 FYDP.

Aviation Programs. Under DoD's current plan, the Army will invest substantial funds in its aviation programs through the end of the next decade to purchase upgraded versions of existing aircraft. CBO assumed that at the same time, the Army would initiate two programs to develop new helicopters—specifically, the Joint Heavy Lift Helicopter and the Future Utility Rotorcraft—to start replacing existing Chinook and Blackhawk aircraft sometime after 2020. Plans also call for 368 new "off-the-shelf" Armed Reconnaissance Helicopters to be purchased by 2011 to replace the Army's aging Kiowa Warriors. All told, the Army's plans for its major aviation pro-

47. That projection incorporates the assumption that the active Army will eventually comprise 48 brigades.

Table 2.**Army Investment Through 2024 Under CBO's Projection Alternatives**

Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Aviation	Develop and buy the new Joint Heavy Lift Helicopter	Upgrade the CH-47F helicopter	Develop and buy the new Joint Heavy Lift Helicopter
	Buy Blackhawk helicopters and begin to develop a new Future Utility Rotorcraft	Buy Blackhawk helicopters	Buy Blackhawk helicopters; develop and buy the new Future Utility Rotorcraft
	Upgrade Apache helicopters	Upgrade Apache helicopters	Rely on unmanned aerial vehicles (UAVs)
	Buy the Armed Reconnaissance Helicopter	Buy the Armed Reconnaissance Helicopter and buy additional Shadow UAVs	Rely on UAVs
Ground Combat	Develop Future Combat Systems	Upgrade the Abrams tank, the Bradley fighting vehicle, and the Paladin howitzer and buy more Strykers	Develop Future Combat Systems
Missiles and Munitions	Buy the HIMARS launcher and GMLRS guided munitions	Buy the HIMARS launcher and GMLRS guided munitions and buy a new missile to replace the Javelin and TOW missiles	Cancel the HIMARS and GMLRS programs and rely on Future Combat Systems launchers and munitions
Other	Implement the Land Warrior program	Cancel the Land Warrior program	Implement the Land Warrior program
Trucks	Buy new and rebuilt HMMWVs, medium trucks, and heavy trucks	Buy new and rebuilt HMMWVs, medium trucks, and heavy trucks	Reduce the number of HMMWVs and medium and heavy trucks and buy the FTTS

Source: Congressional Budget Office.

Note: HMMWV = high-mobility multipurpose wheeled vehicle; HIMARS = High Mobility Rocket System; GMLRS = guided munitions for that system; TOW = tube launched, optically tracked, wire guided; FTTS = Future Tactical Transport System.

a. Current plans are those set out in the Future Years Defense Program. By comparison, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

grams would require \$23 billion from 2006 through 2011 and a total of \$65 billion from 2006 through 2024, according to CBO's projections.

Under CBO's evolutionary approach to Army aviation, all programs to develop new helicopters would be canceled. Instead, the Army would continue to purchase and modernize its existing helicopters. Specifically, it would not invest in a new Joint Heavy Lift Helicopter or Future Utility Rotorcraft but would continue to purchase upgraded versions of Chinook and Blackhawk helicopters. It would also purchase additional Shadow UAVs rather than the UAVs that would have been purchased through

the FCS program. Under the evolutionary alternative, the Army would invest a total of \$56 billion in aviation programs from 2006 through 2024.

By contrast, under CBO's transformational alternative, investment in new and more advanced helicopters would accelerate to allow the Army to replace its current heavy lift and utility craft. In addition, the Armed Reconnaissance and Apache helicopter programs would be canceled; instead, for reconnaissance and long-range attacks, the Army would rely on UAVs and the cannon, rocket launchers, and advanced munitions that would be developed and purchased as part of the FCS program. Invest-

ment in the Army's aviation programs under the transformational alternative would total \$66 billion from 2006 through 2024, CBO estimates.

Ground Combat, Missile, and Munitions Programs. According to DoD's current plans, the pace of FCS introduction would require almost half of the active Army and potentially all of the National Guard to retain their current systems for the next 20 years or more. Accordingly, CBO's projection of Army investment under the current FYDP includes \$25 billion from 2006 through 2024 to upgrade weapon systems and purchase some new weapons, including a smaller, lighter version of the existing Multiple Launch Rocket System—known as the High Mobility Rocket System (HIMARS)—and guided munitions for those launchers (GMLRS).

Under CBO's evolutionary alternative, which would cancel the FCS program, the Army would spend more money than it would under the 2006 FYDP to modernize its current systems. Specifically, from 2006 through 2024, it would invest a total of \$33 billion more in current ground combat systems, missiles, and munitions. Those funds would be used to upgrade the Army's Abrams tanks, Paladin howitzers, and Bradley fighting vehicles; to purchase additional Stryker vehicles; and to develop a new missile to replace the currently deployed Javelin and TOW (tube-launched, optically tracked, wire-guided) missiles developed more than 20 years ago.

By contrast, under CBO's transformational alternative, all funding would be focused on transformational programs at the expense of current systems. Thus, the Army would not invest any funds to upgrade current systems or buy new variants of them (such as HIMARS or GMLRS). Total funding for ground combat systems under the transformational alternative—exclusive of FCS components, missiles, and munitions—would be roughly \$11 billion from 2006 through 2024, or about \$15 billion less than in CBO's projection of current plans.

Other Programs. CBO's alternatives differ from the 2006 FYDP in their treatment of several additional programs—in particular, those for the Land Warrior, trucks, and some missile defenses—that represent significant amounts of funding. The Land Warrior program included in the FYDP would integrate soldiers' equipment (for example, weapons, compasses or other navigational equipment, radios, and night-vision gear) both for the individual soldier and across units. Under the evolutionary

approach, the Army would cancel the Land Warrior program, relying instead on current systems and saving \$6 billion from 2006 through 2024, compared with the approach under the FYDP. (Under the transformational alternative, the program would be retained.)

The Army's current plans envision allocating a considerable amount of funding—\$27 billion, in CBO's projection—to buy tens of thousands of trucks. Under CBO's transformational alternative, the Army would implement a program known as the Future Tactical Transport System (FTTS), which would develop and procure a "family" of trucks that would be more efficient and easier to maintain than those in the Army's current fleet. Furthermore, because of the increased fuel efficiency projected for the vehicles developed in the FCS program, the Army maintains that it will require fewer trucks to support its combat vehicles (by transporting fuel, for example). Under CBO's transformational alternative, therefore, the Army would cut its planned procurement program for its current family of trucks by half and purchase a much smaller number of new and more sophisticated FTTS trucks. That approach would result in savings of \$5 billion from 2006 through 2024 relative to CBO's projection of the implications of current plans.

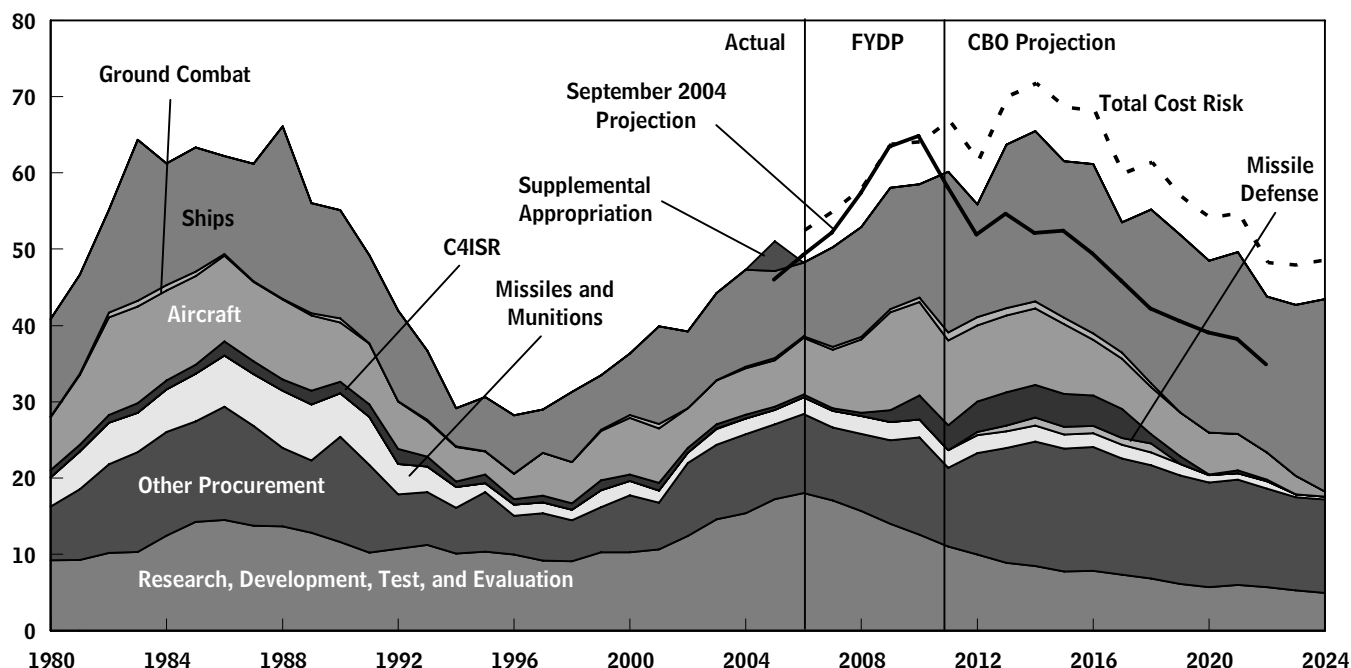
CBO's projection for Army investment covers several programs to procure systems for missile defense (a more detailed discussion of missile defense programs appears later).⁴⁸ Such programs include one designed to field a ground-based kinetic energy interceptor (KEI) to destroy enemy missiles before their warheads separate from their boosters and three programs to provide terminal-phase missile defense—the Patriot Advanced Capability-3 (PAC-3) short-range missile defense system, the Medium Extended Air Defense System (MEADS), and the Terminal High Altitude Area Defense (THAAD) system. According to CBO's projection of the funds needed to carry out the Administration's plan, the four programs would cost the Army a total of \$25 billion from 2006 through 2024.

Under CBO's transformational alternative, the four programs would remain unchanged. Under the evolutionary

48. Funding for research and development of missile defenses is included under CBO's projections for the Missile Defense Agency. Funding to procure selected defenses is included in the investment projections of the military service that would field and operate the missile defense system.

Figure 13.**Past and Projected Resources for Navy and Marine Corps Investment**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program; C4ISR = command, control, communications, computers, intelligence, surveillance, and reconnaissance; FCS = Future Combat Systems.

alternative, the Army would forgo additional deployments in any of its boost-phase missile programs—eliminating its share of funding for the ground-based KEI—as well as procurement of both MEADS and THAAD. Overall, the Army's share of funding for missile defense programs under the evolutionary alternative would equal \$2 billion from 2006 through 2024, representing savings to the Army of \$23 billion.

Navy and Marine Corps Investment

Under DoD's current plans, investment resources for the Department of the Navy (which includes the Marine Corps) would rise from \$48 billion in 2006 to a peak of about \$66 billion in 2014 and then gradually decline to \$43 billion by 2024, CBO projects. Between 2012 and 2024, Navy investment would average \$54 billion a year. If program costs grew as they have in the past, however, the department's investment spending could peak at about \$72 billion in 2014 and then fall back to about \$49 billion by 2024—averaging \$60 billion a year over the 2012-2024 period (see Figure 13). By comparison, under CBO's evolutionary alternative, the department

would require an average of \$40 billion annually in investment resources, excluding cost risk, from 2006 to 2024. Under the transformational alternative, it would require \$43 billion (see Table 3 and Figure 14).

As noted earlier, in constructing its evolutionary alternative, CBO emphasized maintaining existing ship and aircraft programs at the expense of new ones. Specifically, under that scenario, the Navy would cancel the DD(X) destroyer, the CG(X) cruiser, the CVN-21 aircraft carrier, and the future maritime prepositioning ship, commonly called the MPF(F). It would also cancel some new aircraft programs—the V-22 tilt-rotor aircraft, the Joint Strike Fighter, and the unmanned combat air vehicle. To compensate for those cancellations, it would fund investment in upgraded DDG-51 Arleigh Burke class destroyers, the littoral combat ship (a small, fast vessel designed to prevent enemies from denying the Navy access to the world's coastal regions), the Virginia class attack submarine, and the F/A-18E/F fighter. Under the evolutionary alternative, the Navy would replace the Nimitz class nuclear-powered CVN-21 aircraft carriers with large, flat-deck,

Table 3.

Navy and Marine Corps Investment Through 2024 Under CBO's Projection Alternatives

Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Aircraft Carriers	Maintain 11 large-deck nuclear-carriers	Maintain 10 large-deck carriers and buy conventionally powered replacements	Replace each CVN-21 carrier with two small-deck, conventionally powered carriers
Surface Combatants	Buy 10 DD(X) destroyers, 73 littoral combat ships (LCSs), and 16 CG(X) cruisers	Cancel the DD(X) and CG(X) and buy 22 upgraded DDG-51 destroyers and 70 LCSs	Buy six DD(X)s, 42 LCSs, and seven CG(X)s; first purchase of CG(X) is delayed until 2018
Submarines	Increase Virginia class procurement to two per year in 2012 to maintain 39 SSNs	Buy one Virginia class submarine per year	Buy Virginia class submarines until 2011 and then buy smaller nuclear-powered tango-bravo SSNs ^b
Amphibious Ships	Buy six LHA(R)s, four LSD(X)s, and 17 sea-basing-capable MPF(F) ships	Buy one LHA(R), four LSD(X)s, and 15 cargo ships for three squadrons of conventional MPS lift; cancel the MPF(F)	Buy six LHA(R)s, 10 MPF(F)s for one sea-basing squadron of lift, and five cargo ships for one conventional MPS squadron
Combat Aircraft	Buy F/A-18E/F fighters, a version of the Joint Strike Fighter (JSF) for use on the Navy's large-deck carriers, and a short takeoff/vertical landing (STOVL) version of the JSF for Marine squadrons	Forgo the JSF and buy additional F/A-18 E/F tactical fighters for both Navy and Marine squadrons	Forgo the large-deck-carrier version of the JSF and buy all STOVL JSFs for use on small-deck carriers
Marine Rotary Wing Aircraft	Buy the V-22 Osprey tilt-rotor aircraft and CH-53X, UH-1N, and AH-1W helicopters	Buy CH-53X, UH-1N, and AH-1W helicopters; cancel purchase of the V-22 Osprey and buy additional CH-53X and other helicopters	Buy the V-22 Osprey tilt-rotor aircraft and CH-53X, UH-1N, and AH-1W helicopters
Marine Ground Combat	Buy the Expeditionary Fighting Vehicle	Buy the Expeditionary Fighting Vehicle	Buy the Expeditionary Fighting Vehicle

Source: Congressional Budget Office.

Note: SSN = attack submarine; MPF(F) = maritime prepositioning force (future); MPS = maritime prepositioning ship.

- Current plans are those set out in the Future Years Defense Program. By comparison, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.
- Tango-bravo (short for "technology-breakthrough") submarines (which currently are only conceptual) are smaller and less expensive than the Virginia class submarines but nearly equivalent in capability.

conventionally powered carriers. (If the Navy decided to build Nimitz class carriers again, it would first have to restore its ability to make the nuclear reactors used in those ships.)

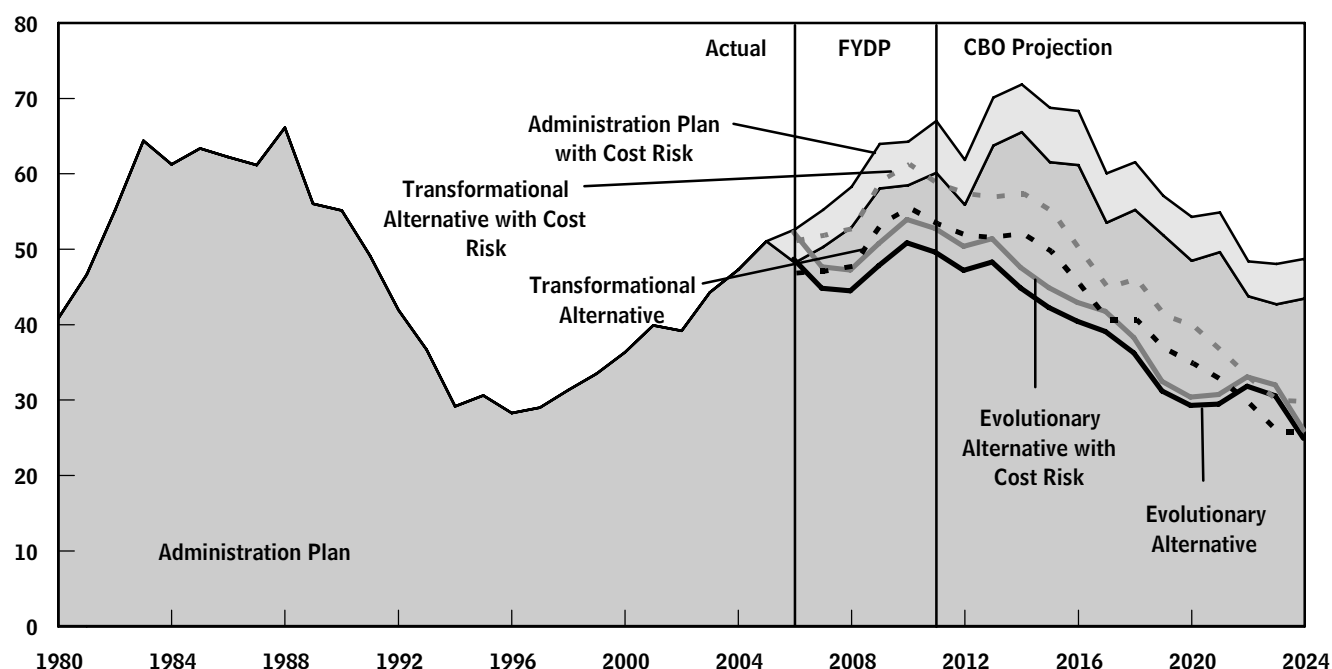
By contrast, under the transformational alternative, the Navy would fund most of its ongoing ship-procurement

programs as well as the new ones it plans, but it would buy smaller quantities or, in the case of aircraft carriers and attack submarines, develop smaller and less expensive versions. Specifically, the Navy under this alternative would reduce the number of DD(X) destroyers, CG(X) cruisers, littoral combat ships, and MPF(F)s that it currently plans to buy. It would cancel the CVN-21 carrier

Figure 14.

Comparison of Evolutionary and Transformational Alternatives: Navy and Marine Corps Investment

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

program but replace each ship it had planned to purchase with two small-deck, conventionally powered carriers equivalent in size to its LHA(R) amphibious assault ship. As a consequence, the large-deck-carrier version of the Joint Strike Fighter would be canceled in favor of a program that comprised short-takeoff-and-landing fighters, the aircraft that the small conventional carriers would operate. (A larger number of smaller carriers would allow the Navy to operate concurrently in more locations than it can now.) Similarly, the transformational alternative would offer the opportunity for a larger attack submarine force. Under its assumptions, the Navy during the next decade would develop and procure an attack submarine that was much smaller and less expensive than the Virginia class but nearly equivalent in capability (a so-called

technology-breakthrough, or "tango-bravo"-type submarine).

Ships. Projections of the Navy's resource demands under both current plans and CBO's two alternatives are driven in large measure by the procurement of battle force ships.⁴⁹ CBO based its assumptions about ship procurement on the Navy's plans for a fleet of between 260 and 325 ships, as outlined in *An Interim Report to Congress on Annual Long-Range Plan for the Construction of Naval Vessels for FY2006*, which was submitted to the Congress on March 23, 2005. However, that report did not specify how many ships the Navy would buy over the next 30

49. See CBO's supplementary *The Long-Term Implications of Current Defense Plans and Alternatives: Detailed Update for Fiscal Year 2006* (forthcoming at www.cbo.gov).

years; it provided data only on how the Navy's inventory of battle force ships would change as the department moved gradually to a fleet of either 260 or 325 ships.⁵⁰ In its projection of current plans, CBO used the average of the number of ships in the two potential fleets—or about 289 ships, which is roughly the same number as in today's fleet of 285 ships.⁵¹

The steady-state fleets associated with CBO's projections of the Navy's current plans and with the transformational and evolutionary alternatives that CBO considered vary in size and composition (see Table 4).⁵² For example, under CBO's projection of current plans, the Navy would maintain a force of 11 aircraft carriers, a number consistent with its 325-ship plan rather than its 260-ship plan (which would maintain only 10). Under the evolutionary alternative, the Navy would have a steady-state fleet of 263 ships versus 242 for the transformational alternative. (The differences among the steady-state fleets associated with CBO's projections arise from the detailed assumptions, described later, that CBO made regarding the numbers and types of surface combatants, submarines, amphibious ships, and aircraft carriers that those fleets would comprise.)

On the basis of DoD's current cost estimates, CBO projects that to sustain a 289-ship fleet, the Navy would have to spend \$21 billion a year between 2006 and 2024; if historical trends in cost growth continued, the Navy would have to spend \$23 billion annually. Under the evolutionary alternative, the Navy would have to spend \$12 billion a year, a savings of \$157 billion over the 2006-

2024 period. Under the transformational alternative, it would require \$14 billion annually through 2024, and savings would be correspondingly less.

Surface Combatants. Although the overall size of the fleet under CBO's projection of current plans would remain about the same as it is today, the surface combatant force would increase substantially as a result of the Navy's purchase of large numbers of littoral combat ships (LCSs). Today, the surface combatant force comprises 101 cruisers, destroyers, and frigates. By 2024, under CBO's projection of current plans, it would consist of 168 ships—including 73 LCSs—with a steady-state size of 152.⁵³

The Navy's plans for the surface combatant force have changed markedly since September 2004, when CBO last prepared its defense projections. The Navy's plans to buy 24 DD(X) destroyers and 24 CG(X) cruisers have been modified; the service now intends to purchase much smaller quantities—10 and 16 ships, respectively. Conversely, the number of LCSs planned for procurement has increased from the former level of 56 ships. In addition, the timing of procurements has changed in some cases. Under the 2006 FYDP, the Navy would purchase the DD(X) destroyer at a rate of one per year through 2011, whereas the 2005 FYDP envisioned increasing production by 2007 to two per year. Under the current plan, the first CG(X) cruiser would be purchased in 2011, seven years earlier than under the 2005 FYDP. In total, the Navy's current procurement plans for surface combatants would cost an average of \$6.3 billion a year between 2006 and 2024, CBO estimates—or \$7.8 billion annually, if historical cost risk is factored in.

Under both the evolutionary and transformational alternatives, the Navy would accrue savings relative to CBO's projection of the cost of its current plans. Under the evolutionary alternative, the DD(X) and CG(X) programs would be canceled, and in their place, the Navy would use upgraded versions of existing Arleigh Burke class destroyers, buying them at a rate of one per year through 2024. The LCS program would remain largely intact, together with the objective of buying 70 ships, but the peak production rate would be reduced to four per year (compared with five per year under the Navy's current plans).

50. At the request of the Chairman of the Projection Forces Subcommittee of the House Armed Services Committee, CBO analyzed the procurement and resource implications of the Navy's interim report. See Congressional Budget Office, *Resource Implications of the Navy's Interim Report on Shipbuilding*, a letter to the Honorable Roscoe G. Bartlett, April 25, 2005.

51. The Navy's ship counts of 260 and 325 include two high-speed ships and three sea-to-shore "connectors." Traditionally, such ships are not counted as battle force ships; thus, the Navy's 260-ship plan comprises 255 battle force ships, and its 325-ship plan, 320 battle force ships. CBO's average of 289 ships and the composition of the fleet under the various alternatives exclude those five transport ships from the battle force totals. However, in all cases, CBO included the money to buy those ships in its projections.

52. The size of the steady-state fleet equals the sum of the average annual purchases of all types of ships in that fleet multiplied by their expected lifetimes.

53. Under the Navy's 260-ship plan, the fleet would include 130 surface combatants, of which 63 would be LCSs. Under the 325-ship plan, surface combatants would number 174, with 82 LCSs.

Table 4.**Steady-State Ship Inventories Under CBO's Projection Alternatives**

Ship Class	Navy's Current Plans		Projection Alternative ^a		
	260-Ship Fleet	325-Ship Fleet	Current Plans	Evolutionary	Transformational
Aircraft Carriers					
Large-deck (Nuclear)	10	11	11	0	0
Large-deck (Conventional)	0	0	0	10	0
Small-deck (Conventional)	0	0	0	0	20
Surface Combatants					
DDG-51 destroyers	44	62	53	84	53
DD(X) destroyers	8	12	10	0	6
Littoral combat ships	63	82	73	70	42
CG(X) cruisers	15	18	16	0	14
Submarines					
SSNs (Attack)	37	41	39	33	39
SSGNs (Guided missile)	4	4	4	0	0
SSBNs (Ballistic missile)	14	14	14	10	10
Amphibious Ships					
LHA(R)	8	8	8	8	8
LPD-17	9	8	9	9	9
LSD(X)	0	8	4	8	0
MPF(F) ^b	14	20	17	0	10
Combat Logistics Force	24	26	25	25	25
Support Ships	5	6	6	6	6
Total^c	255	320	289	263	242

Source: Congressional Budget Office.

Note: The size of the steady-state fleet equals the sum of the average annual purchases of all types of ships in that fleet multiplied by their expected lifetimes.

- Current plans are those set out in the Future Years Defense Program. By comparison, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.
- Includes only ships capable of sea basing. The evolutionary alternative includes 15 conventional maritime prepositioning ships; the transformational alternative includes five.
- Excludes five transports for the sea-basing mission as well as conventional maritime prepositioning ships.

By contrast, under the transformational alternative, the Navy would purchase all three of its new surface combatants but in reduced numbers. It would acquire six DD(X) destroyers, which would be enough to allow two ships to remain on-station overseas (assuming that one ship was based in Japan) to provide a full-time presence. The CG(X) program would not begin until 2018 under this alternative—the same starting date that the Navy had envisioned for the program in the past—and would be reduced to 14 ships. However, because they would be purchased at a rate of one per year, only seven would be ac-

quired by 2024, and just two would be commissioned by that date. The number of LCSs under the transformational alternative would be reduced to 42, although the construction rate would be sustained at five per year until 2017, after which the CG(X) program would begin.

Overall, surface combatants under the evolutionary alternative would cost \$4.5 billion per year between 2006 and 2024 versus \$4.2 billion under the transformational case. If historical cost risk was factored in, procurement of surface combatants would require \$4.7 billion in annual re-

sources under the evolutionary alternative and \$5.2 billion under the transformational alternative.

Submarines. By contrast with the Navy's plans for the surface combatant force, the interim report envisioned reducing the attack submarine (SSN) force to an inventory ranging between 37 and 41 boats. (The previous goal set out in the Navy's 2003 long-range shipbuilding report was 55 boats.)⁵⁴ The current interim report also indicated that the fleet would continue through 2035 to deploy four guided-missile submarines (SSGNs) and 14 ballistic missile submarines (SSBNs). CBO's projections therefore incorporate the assumption that the Navy's current plans envision submarine forces that comprise 39 SSNs, four SSGNs, and 14 SSBNs.

Under the 2005 FYDP, the Navy would have bought two Virginia class attack submarines each year starting in 2009. Under the 2006 FYDP, that level of SSN purchases would begin not in 2009 but in 2012; however, the Navy would still have 44 SSNs in its fleet in 2024 plus four SSGNs. Meeting the objectives in the interim report for the Navy's submarine inventory would require beginning the construction of a replacement for the SSGNs in 2018 and a new SSBN in approximately 2022. Another aspect of the Navy's current plans that affects the size of the submarine fleet is that as many as nine submarines are to be based in Guam in coming years, with each of them providing more than twice the forward presence of an SSN based in the continental United States (because of their proximity to peacetime theaters of operations). CBO projects that the 2006 FYDP's plans for sustaining the attack, guided missile, and ballistic missile submarine forces will cost, on average, more than \$7.5 billion per year over the next two decades, or as much as \$8.3 billion annually including cost risk.

Under the alternatives developed by CBO, the Navy would pursue either a smaller submarine force or a less expensive SSN. Under the evolutionary case, the Navy would maintain the construction rate for Virginia class boats at one per year through 2024. That pace would lead eventually to a force of 33 SSNs in the 2030s—but not before the force had fallen to one as small as 28 SSNs in

the late 2020s. Under the transformational alternative, the Navy would maintain the SSN force at 39 by building tango-bravo-type nuclear-powered submarines that would be smaller than the existing Virginia class boats. CBO assumed that those smaller submarines would cost about three-quarters as much as a Virginia class submarine and be about as capable.⁵⁵ Under both the transformational and evolutionary alternatives, the Navy would retire the SSGNs without replacing them and reduce the SSBN force to 10, delaying the need to build a new SSBN until 2026. Thus, under the evolutionary alternative, the Navy would require \$3.5 billion per year, on average, through 2024 to sustain the submarine forces; under the transformational scenario, it would need \$4.6 billion.

Amphibious and Maritime Prepositioning Ships. The Navy's amphibious lift ships are organized into expeditionary strike groups, each comprising one amphibious assault ship or helicopter carrier (LHA or LHD), one amphibious transport dock (LPD), and one dock landing ship (LSD), together with some surface combatants and an attack submarine. The Navy's interim report on shipbuilding envisions reducing the number of expeditionary strike groups from 12 to eight by 2035. Both the Navy's 260- and 325-ship plans, however, would maintain 11 or 12 LHAs or LHDs at least until 2029, which implies a robust building program through 2035 for the LHA(R)—a new amphibious ship class that the Navy plans to begin in 2007. Furthermore, the Navy's plans imply that the second ship of the LHA(R) class will be larger and more capable than the first, displacing more than 50,000 tons. With respect to other ship types, the two fleet plans diverge. The 325-ship plan would build eight LSD(X)s in the 2020s to replace existing LSDs, whereas the 260-ship plan would do without LSDs. In terms of the Navy's plans to build new maritime prepositioning ships—that is, MPF(F)s—to support its goals for

54. Department of the Navy, *A Report to Congress on Annual Long-Range Plan for the Construction of Naval Vessels* (May 2003). The report was mandated by the National Defense Authorization Act for Fiscal Year 2003.

55. That assumption is based on what various officials in the Navy and private industry have said might be achievable. CBO does not have enough information to develop an independent estimate of the cost of a tango-bravo-type submarine. Rather, it assumed that the Navy, by using new technologies (such as modular weapon bays and exterior podded motors) could reduce the size of the pressure hull on the submarine, thus cutting costs without necessarily sacrificing capability. For more discussion, see Ronald O'Rourke, *Navy Ship Acquisition: Options for Lower-Cost Ship Designs—Issues for Congress* (Congressional Research Service, May 11, 2005).

sea basing, the service would build 20 ships under the 325-ship plan versus 14 under the 260-ship plan.⁵⁶

For this analysis, CBO split the difference: it assumed that the Navy would build 17 MPF(F)s and four LSD(X)s, purchasing all of the MPF(F)s by 2024 and the LSD(X)s after that time. Resource demands for such a program, in CBO's estimation, would be \$3.1 billion per year, on average, through 2024. If cost risk was included, required resources would average \$3.3 billion per year.

Under the evolutionary alternative, the Navy could reduce the resources required for that plan by more quickly cutting the number of expeditionary strike groups to eight. That approach would permit it to delay until 2024 the acquisition of the first LHA(R), which could then be ready to replace the first of the eight LHDs in 2029, when the LHD reached the end of its 40-year service life. Also under this alternative, the Navy would buy eight LSD(X)s, although only four would be bought through 2024. In addition, the Navy would not incorporate a sea-basing capability in its MPF(F) ships; instead, to carry out traditional maritime prepositioning missions, it would buy conventional cargo ships. To maintain the existing capability, 15 such ships would be bought, or enough to outfit three squadrons of ships to transport three Marine expeditionary brigades.⁵⁷

Under the transformational alternative, there would be little difference between the first LHA(R) and subsequent ships of the class; nevertheless, the Navy would procure them according to roughly the same schedule as that in the 2006 FYDP. In addition, it would buy one squadron of sea-basing-capable MPF(F) ships and one squadron of conventional prepositioning ships. The LSD(X) program would be canceled under this alternative.

CBO projects that those changes would require \$1.4 billion per year, on average, under the evolutionary case and \$2.3 billion under the transformational alternative. Including cost risk would increase those amounts to \$1.5 billion and \$2.4 billion, respectively.

Aircraft Carriers. The Navy's interim report on shipbuilding projected a future carrier force of 10 to 11 large-deck ships. For the purposes of this analysis, CBO assumed that the Navy's current plans would encompass 11 large-deck, nuclear-powered aircraft carriers. According to the 2006 FYDP, the Navy expects to order the first of its new class of aircraft carriers, the CVN-21, in 2008, which represents a delay of one year relative to the starting date incorporated in the 2005 FYDP. Under a plan to maintain 11 carriers, the Navy would need to order a new ship about every five years thereafter in addition to refueling an existing nuclear-powered Nimitz class carrier about every three years. CBO projects that those efforts would require \$3.1 billion annually, on average, through 2024, or \$3.3 billion with cost risk.

In developing its alternatives, CBO substituted conventional carriers for the CVN-21 program. Under the evolutionary scenario, the Navy would buy large-deck conventional carriers—roughly the same size as the existing conventional carriers *Kitty Hawk* and *John F. Kennedy*—which would displace about 80,000 tons. In addition, the force goal for the carrier fleet would be reduced to 10, permitting the first conventional carrier to be bought in 2012. Under the transformational alternative, the Navy would acquire two LHA(R) ships and operate them in a light-carrier configuration (as small-deck aircraft carriers) in place of each CVN-21 that it would otherwise have purchased.⁵⁸ Over the very long run, that option would imply a carrier force of 20 ships that each displaced about 45,000 tons. However, because the Navy's carriers have a service life of about 50 years, by 2024, the fleet under this alternative would still comprise nine Nimitz class carriers and four LHA(R)s in the light-carrier configuration. (That total does not count the LHA(R)s that would be assigned to the amphibious lift mission.)

CBO estimates that overall, the Navy would require an average of \$2.3 billion annually for carriers through 2024 under the evolutionary alternative and \$2.0 billion annually under the transformational alternative.

Aircraft. The Department of the Navy's investment in aviation programs includes funding for both Navy and

56. The Navy's plans for sea basing envision supporting Marine Corps ground combat forces ashore from ships at sea—rather than by first establishing a land base for support.

57. See Congressional Budget Office, *The Future of the Navy's Amphibious and Maritime Prepositioning Forces* (November 2004).

58. Similar ideas have been proposed in Office of the Secretary of Defense, Office of Force Transformation, *Alternative Fleet Architecture Design* (January 31, 2005); and Robert O. Work, *Winning the Race: A Naval Fleet Platform Architecture for Enduring Maritime Supremacy* (Washington, D.C.: Center for Strategic and Budgetary Assessments, March 1, 2005).

Marine Corps aircraft and for aircraft-related weapon systems. According to DoD's current plans, that investment would total about \$93 billion between 2006 and 2011—or 28 percent of the Navy's planned budgets for all investment. Continuing current plans beyond 2011 through 2024 would result in a total investment of about \$112 billion, CBO projects. To support that investment over the FYDP period would require average annual funding of about \$16 billion; between 2012 and 2024, average annual resource demands would be slightly less than \$9 billion. If the costs of developing and purchasing naval aviation systems grew beyond the current estimates to the same extent as they have in the past, carrying out the Navy's current plans would require an additional \$2 billion per year, on average, between 2012 and 2024.

Under CBO's evolutionary alternative, average annual investment over the 2006-2024 period for the Department of the Navy's aviation programs would decrease by 23 percent. Under the transformational alternative, those average annual investments would decline by 7 percent, to about \$10 billion. Under both of those alternatives, the most noteworthy deviations from the Administration's current plans would be in investment in fighter and other fixed-wing aircraft for the Navy and in tilt-rotor and rotary-wing aircraft for the Marine Corps.

Fighter Aircraft. The Navy's plans for fighter aircraft include the purchase of 148 more F/A-18E/F aircraft, 90 EA-18G electronic warfare aircraft (to replace the EA-6B), and 680 F-35 Joint Strike Fighters in two variants: the F-35B short takeoff/vertical landing (STOVL) variant for the Marine Corps and the F-35C carrier variant for the Navy.⁵⁹ In addition, the Navy is pursuing an unmanned combat air vehicle (UCAV-N) for carrier-based strike or defense-suppression operations, and CBO assumed that 90 of those vehicles would be purchased by 2024. Investment resources for those five types of aircraft would total \$88 billion over the 2006-2024 period.

Under CBO's evolutionary alternative, the Navy would cancel the Joint Strike Fighter and the UCAV-N and instead purchase more F/A-18E/F aircraft, resulting in

savings of about \$29 billion. The Marine Corps under this alternative would receive a number of F/A-18E/Fs equal to today's inventory of F-18C/D and AV-8B aircraft but would forgo the capability, now provided by the AV-8B, to operate fixed-wing strike aircraft from the decks of amphibious ships. Under CBO's transformational alternative, the Navy would cancel the F-35C and curtail its purchases of the F/A-18E/F aircraft (to reflect the alternative's assumption of a smaller number of large-deck aircraft carriers relative to current plans). Instead of purchasing the F/A-18E/F aircraft, the Navy would procure an additional 130 F-35B aircraft to operate from the new light aircraft carriers to be bought under this alternative. Through 2024, those changes would save about \$15 billion, in CBO's estimation.

Other Fixed-Wing Aircraft. In addition to fighters, the Navy plans to procure several other types of both carrier- and land-based fixed-wing aircraft. They include:

- A new version of the carrier-based E-2 Hawkeye airborne early warning aircraft;
- A new land-based patrol aircraft, the Multi-Mission Maritime Aircraft, or MMA (the MMA is based on a Boeing 737 airframe and will replace the P-3C Orion); and
- An unmanned Broad-Area Maritime Surveillance (BAMS) aircraft that is currently envisioned to fill a role similar to the Air Force's Global Hawk.

Under CBO's transformational alternative, no changes would be made to those plans. Under the evolutionary alternative, the Navy would cancel the MMA and instead extend the service life of the P-3C fleet with more-modest improvements to its capabilities than would be provided by the MMA.

Marine Corps Rotary-Wing and Tilt-Rotor Aircraft. The 2006 FYDP calls for replacing or upgrading nearly every component of the Marine Corps's tilt-rotor and rotary-wing forces. The MV-22 Osprey tilt-rotor aircraft is slated to replace the current fleet of CH-46E medium-lift helicopters. For its heavy-lift transport mission, the Marine Corps is finalizing plans to replace its fleet of CH-53E helicopters with an upgraded version currently called the CH-53X. Current plans also include the modernization of the fleets of UH-1N light utility helicopters and AH-1W attack helicopters with remanufactured air-

59. The October 2001 Milestone B procurement baseline for the Department of the Navy reflected 609 STOVL aircraft for the Marine Corps and 480 CV (carrier) aircraft for the Navy—a total of 1,089 aircraft. The Navy/Marine Corps Tactical Aviation Integration Plan reduced that total to 680 aircraft. The resulting mix of STOVL and CV variants remains undetermined.

craft. Planned investment among those programs would total about \$46 billion through 2024, CBO estimates.

Under CBO's transformational alternative, no changes would be made to those plans. Under the evolutionary alternative, the Navy would cancel the MV-22 Osprey helicopter; it would replace CH-46Es with a mix of 408 helicopters whose capabilities and costs were similar to those of such aircraft as the EH-101 or H-92 and 80 CH-53X helicopters (that is, 80 CH-53s in addition to those that the Marine Corps is already planning to buy).⁶⁰ Savings under the evolutionary alternative would total more than \$4 billion. In addition, if the Navy transferred its existing MV-22s to the Air Force, the Air Force under this alternative could reduce its investment spending and eliminate the need to buy V-22 aircraft for conversion to the CV-22 special-operations version.

Air Force Investment

Under the Administration's current plans, funding for research, development, test, and evaluation (RDT&E) and for procurement of Air Force systems will rise from roughly \$55 billion in 2006 to about \$57 billion in 2011. Between 2012 and 2024, CBO projects, annual resource demands will average roughly \$61 billion, or about 9 percent more than the average amount over the span of the FYDP. If the costs of developing and purchasing Air Force systems grew beyond the service's current estimates to the same extent as they have in the past, carrying out the Administration's current plans would require an additional \$6 billion per year, on average, between 2012 and 2024.

There are substantial differences between CBO's current and its 2004 projections of the Administration's plans, and those differences stem primarily from changes in several large programs. The most significant in the next several years include the curtailment of the F/A-22 fighter program, delays in procurement of the F-35 Joint Strike Fighter, and delays in several planned space systems. In addition, developments over the past year in the Air Force's long-term planning for such systems as a proposed medium-range bomber and for replacements for a heavy

bomber and the KC-135 tanker, as well as in the schedules anticipated for launching new and replacement satellite systems, led CBO to change its projections for the period beyond 2011. As a result of those alterations, CBO's current projections imply a relatively stable average level of investment for the Air Force between 2012 and 2024.

By comparison, under CBO's evolutionary and transformational alternatives, levels of investment would be lower (see Figures 15 and 16 and Table 5). If potential cost growth was not included, average annual savings in investment funding over the entire 2006-2024 period would be \$15 billion under the evolutionary alternative and \$4 billion under the transformational alternative.

Combat and Support Aircraft. Funding to develop and procure new aircraft accounts for a significant portion of the Air Force's projected investment budget—if C4ISR aircraft are excluded, about 25 percent, in CBO's estimation.⁶¹ CBO's assessment of the Air Force's resource demands in the next few years incorporates the Administration's recent decision to curtail purchases of the F/A-22 fighter (the service will buy 179 aircraft) and the delay in the schedule for the Joint Strike Fighter. CBO's projections also incorporate the assumption that the Air Force will continue to procure the C-130J transport through the end of the current multiyear contract.⁶²

Over the longer term, the following programs contribute significantly to the Air Force's investment demands:

- Continued development of the conventional takeoff and landing variant of the Joint Strike Fighter and eventual production at a rate of 110 aircraft per year.
- Replacement of the Air Force's KC-135 airborne tanker fleet, with initial purchases in 2008. CBO's estimate of unit costs for the proposed tanker is consistent with those for a new aircraft (as opposed to a refurbished version of an existing plane), such as the Boeing 767. DoD is currently analyzing alternatives to define its tanker-replacement strategy.

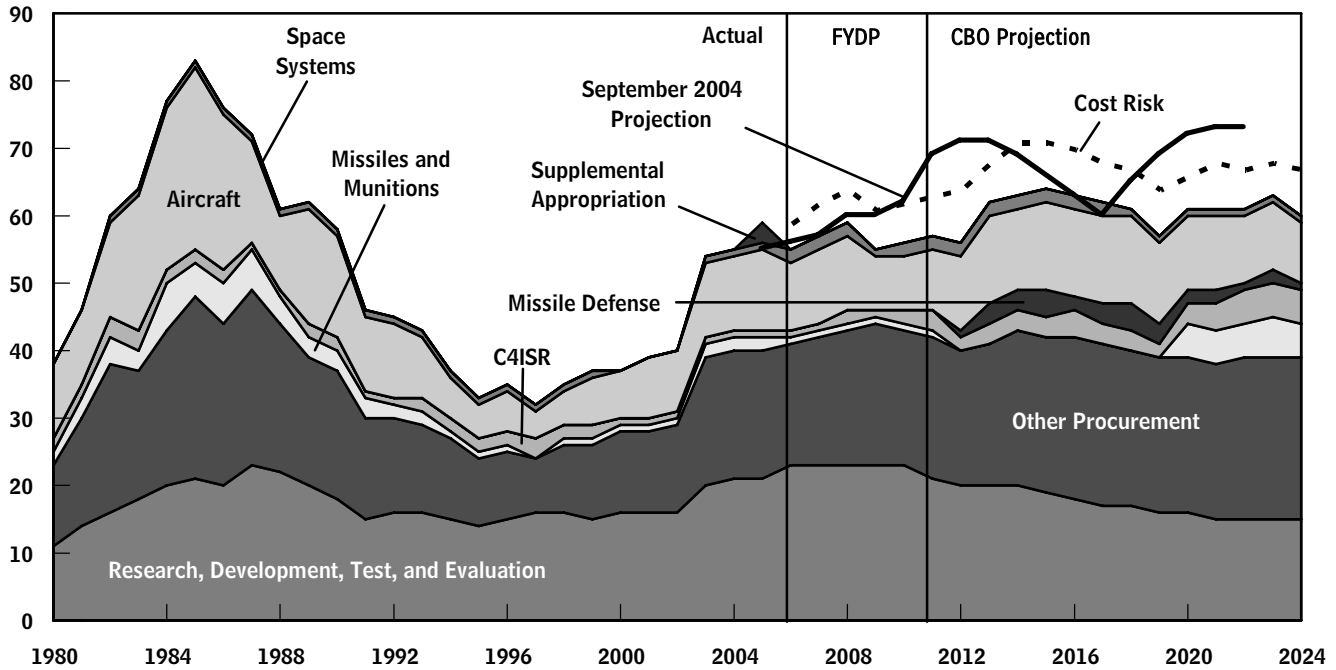
60. The EH-101, a helicopter built by Augusta-Westland, is used by the military services of a number of countries, including Italy and the United Kingdom. The U.S. Navy is purchasing a variant of the EH-101, called the US-101, as the replacement for the Presidential helicopter. The H-92 would be a military version of Sikorsky's S-92 commercial helicopter.

61. The abbreviation "C4ISR" stands for command, control, communications, computers, intelligence, surveillance, and reconnaissance.

62. The President's budget request for 2006 showed C-130J procurement being terminated before the current contract was completed. However, subsequent statements from DoD indicate that the Administration intends to restore C-130J funding through the term of the multiyear contract.

Figure 15.**Past and Projected Resources for Air Force Investment**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program; C4ISR = command, control, communications, computers, intelligence, surveillance, and reconnaissance.

- Development and initial production of an intermediate-range bomber. The aircraft is intended to provide an interim capability (procurement would begin in 2015) before the Air Force develops and fields a new long-range bomber (sometime after 2024).
- Continued development of unmanned combat aircraft, with purchases beginning in 2012.

Under CBO's evolutionary alternative, those programs would be canceled or deferred and replaced with purchases of existing systems or with service-life extensions and technology upgrades to aircraft already in the Air Force's inventory. Specifically, under that alternative, the Air Force would cancel the F/A-22 and Joint Strike Fighter programs and replace those aircraft with an upgraded version of the F-15C and a more advanced F-16 than the aircraft now being flown. The Air Force would also delay by about 10 years purchases of a replacement for the KC-135 tankers and in the interim convert the remaining E-model KC-135s to the R-model configura-

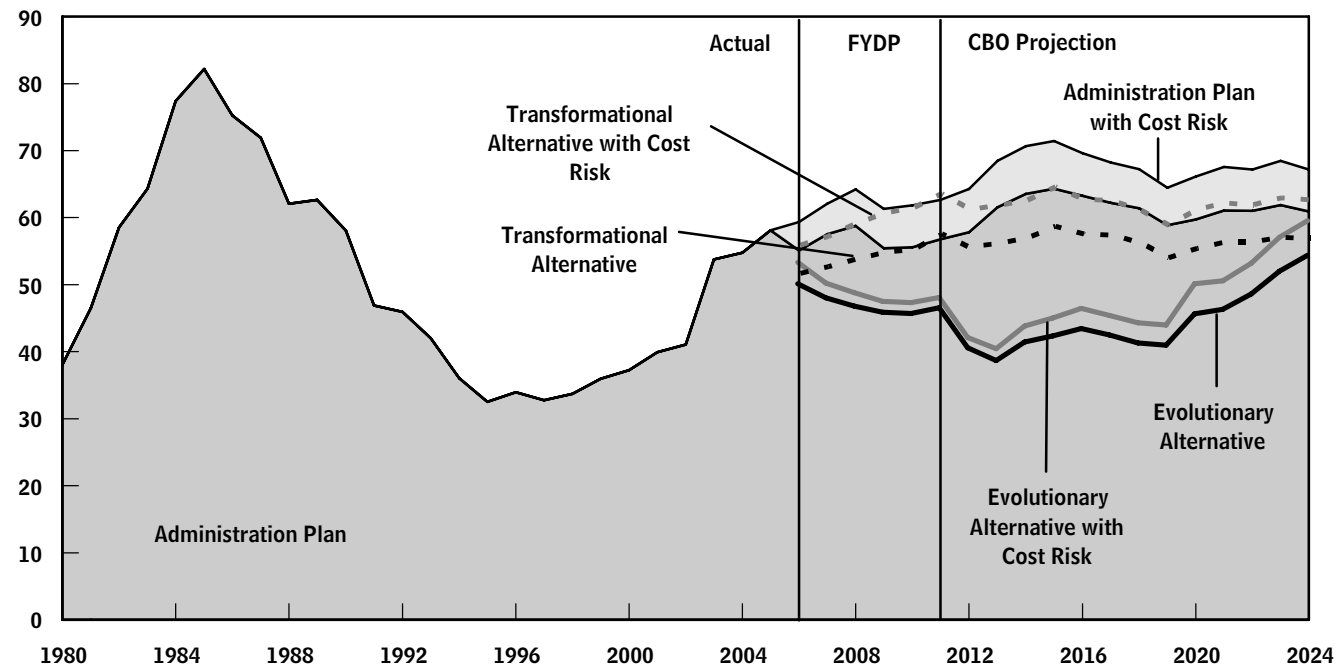
tion. In addition, the service would cancel the intermediate-range bomber that it had planned to introduce in about 2015 and, by accelerating development, substitute a heavy bomber as a replacement. That long-range strike aircraft would incorporate less-dramatic advances in technology than the Air Force envisions for its next bomber; however, under the evolutionary scenario, the aircraft would be ready for fielding shortly before 2024—more than a decade earlier than under the Air Force's current plans.

Under the transformational alternative, the focus would be on replacing manned aircraft with unmanned aircraft. The Air Force and the Navy are currently developing unmanned combat air vehicles whose proposed missions include air-to-ground attack and suppression of enemy air defenses. The transformational alternative incorporates the assumption that UCAVs will realize their potential and that the Air Force will purchase them in lieu of the proposed medium-range interim bomber and half of the F-35 Joint Strike Fighters that it had planned to buy.

Figure 16.

Comparison of Evolutionary and Transformational Alternatives: Air Force Investment

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

Under that alternative, the Air Force would also cease production of the F/A-22 fighter after 2006 and round out its fighter forces with F-35Bs, the STOVL variant of the Joint Strike Fighter. Although the Air Force would lose some air-to-air capability under that scenario, it would improve its ability to operate in the types of "aus-tere," or antiaccess, environments (for example, locations without good runways) that concern planners. Recently, the Air Force has expressed interest in purchasing an undetermined number of those STOVL aircraft.

C4ISR and Threat Warning Systems. The Air Force's C4ISR systems can be roughly divided into two categories: systems based on aircraft and systems based on satellites.

Aircraft-Based Systems. Today's airborne C4ISR forces consist of modestly sized fleets of aircraft, such as U-2 re-

connaissance aircraft, E-3 Airborne Warning and Control System (AWACS) aircraft, and E-8 Joint Surveillance and Target Attack System (JSTARS) aircraft, as well as small numbers of specialized electronic-warfare aircraft (used, for example, for jamming and surveillance), such as the RC-135 Rivet Joint. The Air Force also operates and is continuing to procure two types of unmanned intelligence, surveillance, and reconnaissance (ISR) aircraft: the high-altitude, long-endurance Global Hawk and the smaller Predator.

According to the Air Force's current plans, investment resources for the airborne category of C4ISR systems will be directed predominately toward the development and fielding of the E-10 aircraft as a replacement for the E-8 and possibly, in a later version, for the E-3. (The E-10 would have more-advanced radar and more room aboard to serve as an airborne command facility.) Under the

Table 5.**Air Force Investment Through 2024 Under CBO's Projection Alternatives**

Investment Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Aircraft	Purchase 179 F/A-22 fighters	Cease ordering F/A-22 fighters after 2005 and buy upgraded versions of the F-15C fighter	Cease ordering F/A-22 fighters after 2005 and buy the short takeoff/vertical landing version of the Joint Strike Fighter (JSF)
	Purchase the JSF	Cancel the JSF and buy more advanced F-16 fighters (Block 60)	Buy fewer JSFs but additional unmanned combat air vehicles (UCAVs)
	Develop and begin initial production of an "interim bomber"	Extend the service life of the F-117A and accelerate development of a heavy bomber	Develop a long-range supersonic strike missile
	Develop a replacement for the KC-135 tankers	Upgrade KC-135 tankers and delay development of a replacement tanker	Develop a replacement for the KC-135 tankers
	Develop UCAVs	Cancel development of the UCAV	Expand the use of UCAVs
C4ISR	Develop and field the E-10 aircraft to replace the E-8 (and possibly the E-3)	Upgrade the E-8 and E-3 aircraft now in the fleet	Develop and purchase unmanned electronic warfare aircraft
	Invest in the Space Radar program	Cancel the Space Radar program	Invest in the Space Radar program
	Develop and launch the SBIRS (High) satellites	Develop and launch the SBIRS (High) satellites	Develop and launch the SBIRS (High) satellites
	Develop and launch the Transformational SATCOM (TSAT) satellites	Cancel the TSAT program and sustain current Advanced Extremely High Frequency satellites	Develop and launch the TSAT satellites
Other Space	Develop and launch GPS Block III satellites	Cancel the GPS Block III program and continue buying GPS Block IIF satellites	Develop and launch GPS Block III satellites
	Develop the Common Aero Vehicle	Cancel development of the Common Aero Vehicle	Develop the Common Aero Vehicle
Missiles and Munitions	Pursue enhancements to existing programs	Pursue enhancements to existing programs	Develop a long-range supersonic strike missile

Source: Congressional Budget Office.

Note: SBIRS (High) = space-based infrared system in high earth orbit; SATCOM = satellite communications; GPS = Global Positioning Satellite.

- a. Current plans are those set out in the Future Years Defense Program. By comparison, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

evolutionary alternative, the Air Force would cancel the E-10 program and focus on upgrading the E-8 and E-3 aircraft currently in the fleet. Those upgrades would include modernizing the aircraft as necessary (for example, with new engines, as in the case of the KC-135R tanker conversions) and developing better radar systems. Such systems, although they might be improved, could still lack the potential capability of the E-10 because that larger aircraft (a Boeing 767 instead of the much older Boeing 707) could accommodate larger antennae.

Under the transformational alternative, the Air Force would develop and purchase an unmanned aircraft instead of the E-10. That unmanned aircraft might also be limited in the size of the radar it could carry (by comparison with the radar allowed by the use of a 767) and would be unable to function as an airborne command post. However, if aerial refueling technology for unmanned aircraft could be successfully developed, such aircraft would have greater endurance (could remain in the air longer) relative to an E-10 because there would be no need for human crew members to rest. (The transformational option incorporates the assumption that 24 of those notional unmanned systems could provide the same coverage as 35 E-10 aircraft.)

Satellite-Based Systems. The Air Force's current plans for investment in unclassified space-based C4ISR and threat warning systems primarily focus on transformational developments to replace existing capabilities.⁶³ Those developments include increased communications capabilities to be provided by the Transformational Satellite Communications System, or TSAT (which will provide high-capacity communications for military users around the globe); new ISR capabilities, such as the Space Radar (which will potentially allow it to detect and track targets globally); and the SBIRS (High)—the Space-Based Infrared Sensor—to replace the current Defense Support Program satellites that warn of missile launches. Until those systems can be developed, the Air Force plans to maintain or enhance its present capabilities by continuing to invest in near-term or interim systems, such as the Advanced Extremely High Frequency (EHF) and Wideband Gapfiller communications satellites.

Given the substantial extent to which the Air Force's plans for space programs incorporate transformation, CBO developed only an evolutionary alternative to those plans. Under that alternative, the Air Force would focus on maintaining and improving the current capabilities of its satellites instead of on developing new systems. Thus, it would sustain a constellation of three Advanced EHF satellites through 2024 and continue operating the Wideband Gapfiller constellation. However, the Air Force would terminate both the TSAT and Space Radar programs, forgoing the new ISR capabilities that the latter would provide.

Other Space Systems. DoD's classification of space systems—in addition to communications, ISR, and threat warning systems—includes the following categories: position, navigation, and timing; space control (such as ground- and space-based sensors as well as capabilities to protect U.S. satellites and equipment from enemy attack); force application (such as conventional munitions, discussed below, that are deployed from or through space); space launch; environmental monitoring; and satellite control and launch ranges.

- Position, navigation, and timing are provided by the NAVSTAR Global Positioning Satellite (GPS) constellation of 24 satellites, which have been developed through a series of successive upgrades referred to as "blocks." Currently, the Air Force is launching Block IIR-M satellites; it plans to begin launching Block IIF satellites in 2007 and, starting in 2012, to field Block III satellites that include significant improvements in such features as antijam capability. Under CBO's evolutionary alternative, the Air Force would cancel the GPS Block III program and continue to field Block IIF satellites.
- Under the 2006 FYDP, funding for space control programs would increase by \$195 million to \$768 million annually between 2006 and 2011. Programs supported by that funding include Spacetrack, which is developing radar and optical sensors (such as the Optical Deep Space Imager), and the Space-Based Surveillance System (as well as other, ground-based systems) designed to track objects in space. Within the force application category, the Air Force is focusing its resources on developing the Common Aero Vehicle, a conventional warhead that can be launched by an intercontinental ballistic missile or, ultimately, from space.

63. In this context, unclassified space programs are those whose existence is openly acknowledged. CBO's projections exclude explicit consideration of systems that are classified—such as those managed by the National Reconnaissance Office.

- Space launch programs include the Evolved Expendable Launch Vehicle used by DoD to place all of its satellites in orbit as well as the new Operationally Responsive Spacelift system designed to provide launchers and satellites capable of rapidly placing payloads in orbit. Projected investment in environmental monitoring satellites (more commonly referred to as weather satellites) under the 2006 FYDP and through 2024 totals \$3 billion, CBO estimates, and is concentrated in two systems: the existing Defense Meteorological Satellite Program, which is currently expected to launch its last satellite in about 2012, and the new National Polar Orbiting Environmental Satellite System (NPOESS).⁶⁴ Under CBO's evolutionary alternative, the Air Force would make no changes in those systems nor in funding for satellite control and launch ranges.

Missiles and Munitions. The Air Force's planned missile and munitions programs would maintain inventories of current weapons as well as develop several new systems. For example, purchases would continue for the AIM-120 and AIM-9X air-to-air missiles and the Joint Direct Attack Munition, a family of satellite-guided air-to-ground bombs. The two most significant new systems would be the Small-Diameter Bomb, a compact precision air-to-ground munition that is just going into production, and a replacement for the Minuteman III intercontinental ballistic missile that the Air Force plans to have available in about 2020.

Under CBO's evolutionary alternative, the Air Force would make no changes in those plans. Under the transformational alternative, the service would continue to pursue its current plans and also develop a new supersonic strike missile, which would help provide the capability to attack targets quickly, once they have been detected. In addition, the missile would enable less expensive aircraft (those not incorporating stealth capabilities) to replace some of the capacity for rapid strikes that would be lost with the cancellation of the Air Force's medium-range bomber.

Defense Agency Investment, Including Missile Defenses

In addition to resources for the Departments of the Army, Navy, and Air Force, DoD's budget provides money for a variety of specialized agencies that perform advanced research, develop missile defenses, oversee special operations, and manage information systems. Excluding development of missile defenses—which is discussed in detail below—investment funding for those agencies averages about \$13 billion per year under the 2006 FYDP and about \$16 billion per year over the 2012-2024 period under both CBO's projection of DoD's current plans and CBO's transformational alternative (see Figure 17).

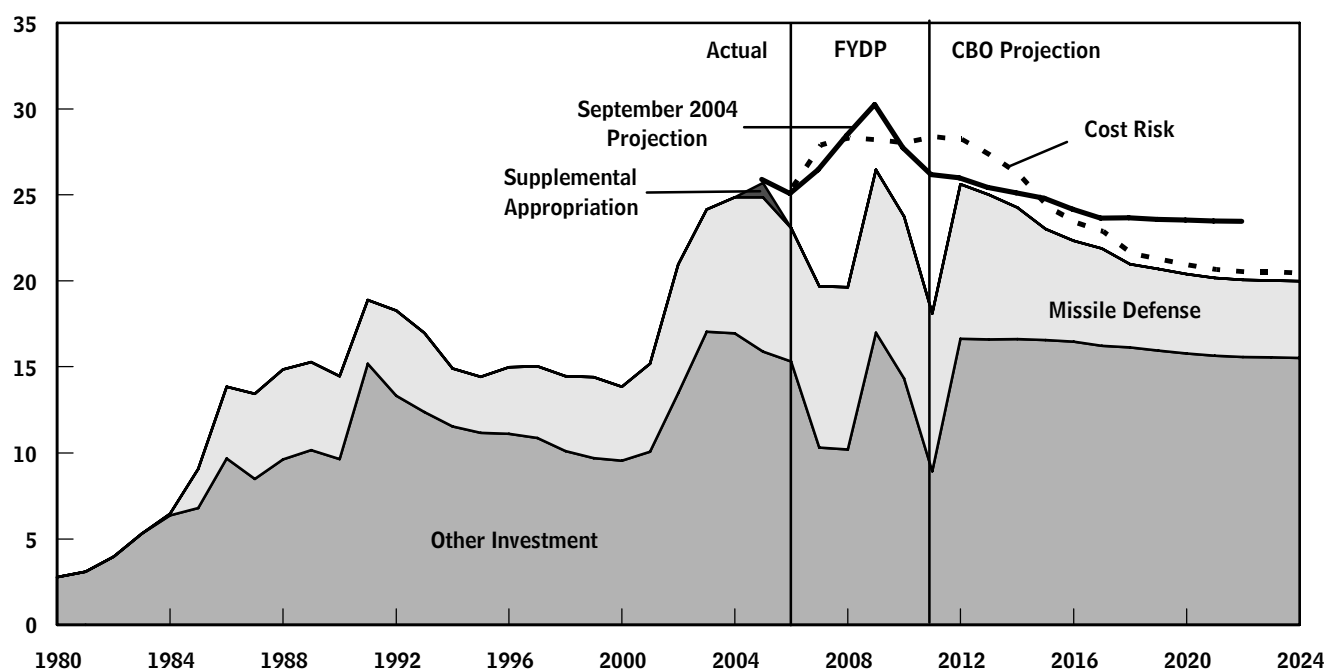
Defense Agencies. CBO's estimate of overall resource demands for defense agencies differs from its September 2004 estimate in part because of modifications in CBO's projection of the Missile Defense Agency's plans and in part because of two changes in the way the Administration prepared this year's FYDP. The latter changes account for the majority of the differences between DoD's previous and current plans for the period spanning 2006 to 2009 and CBO's previous and current projections. In the 2005 FYDP, the Administration included about \$8 billion to fund unspecified research and development projects associated with military transformation. CBO's projection incorporated the assumption that that practice would continue indefinitely, commensurately raising the demand for future resources. However, the 2006 FYDP no longer includes that additional funding, so CBO's current projection omits it as well.

The second major change in the 2006 FYDP is that the Administration has inserted an accounting credit of about \$19 billion into the defense agency accounts over the 2006-2011 period. That credit (what some observers call a "negative wedge") represents the difference between the costs of the programs set out in the FYDP and the fiscal controls that DoD uses for planning. (That is, executing all of the plans in the FYDP would cost \$19 billion more than the budget levels that DoD has been instructed to plan for.) CBO treated that accounting credit as a source of cost risk during the FYDP period—because DoD may not be able to curtail enough other activities to bring its plans into line with its assumptions about funding. CBO assumed for its projection through 2024 that after the FYDP period, DoD would continue to face

64. Funding for the NPOESS program is being split between the Air Force and the Department of Commerce.

Figure 17.**Past and Projected Resources for Defense Agency Investment, Including Missile Defense**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program.

additional costs each year similar to the additional costs it faced in 2011.

Under CBO's evolutionary alternative, funding for those agencies (again, excluding activities related to missile defenses) would revert to its average share of DoD's budgets over the past 20 years. That share represents a funding reduction of 2 percent over the 2012-2024 period relative to CBO's projection of DoD's current plans (see Figure 18).

Missile Defenses. The President's 2006 budget request and the 2006 FYDP propose funding averaging \$10 billion annually for the research, development, testing, and evaluation of missile defense systems (see Figure 19). CBO based its projection of DoD's current plans for missile defenses on the Administration's policy statements as well as on the more-detailed plans developed by the Missile Defense Agency (MDA) for executing the individual programs for which it is responsible. The Administration has indicated that throughout the period of the FYDP,

MDA will focus on researching and developing a broad range of technologies and potential systems. Decisions about which systems should proceed to procurement and operational deployment will eventually be made on the basis of the results of those efforts.

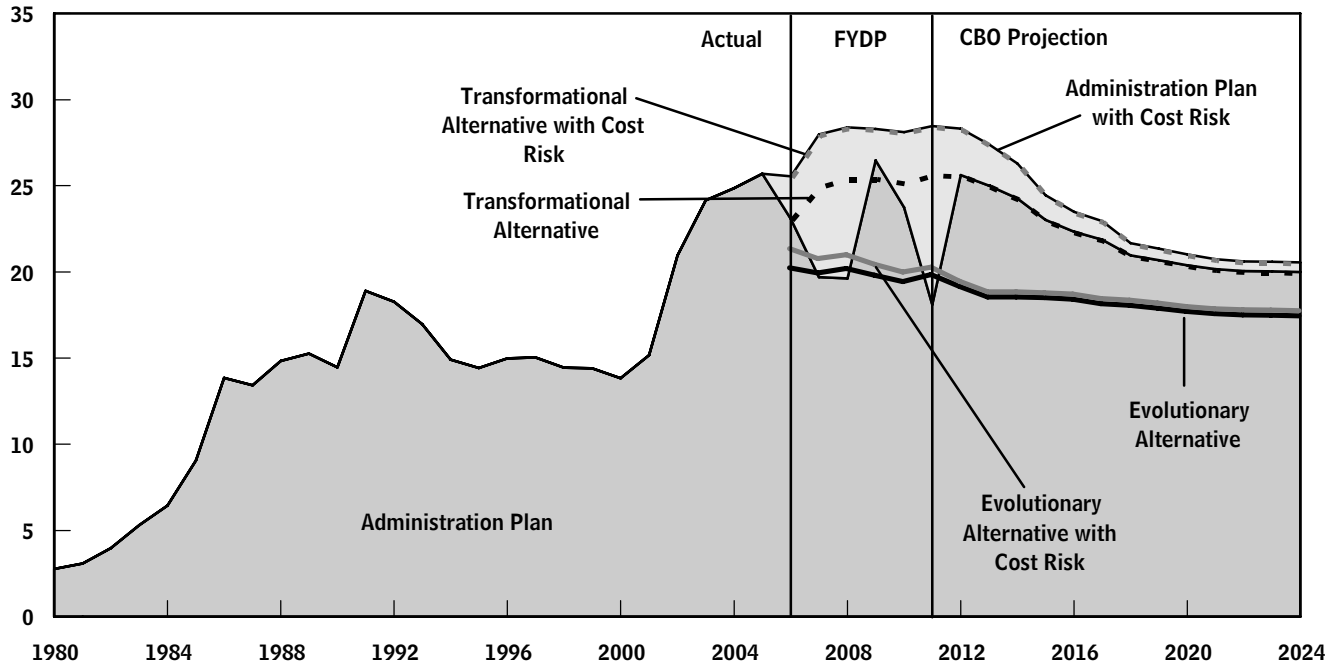
Carrying out current plans would cause total investment costs for missile defenses to peak in 2013 at about \$15 billion (excluding cost risk), CBO projects, and then decrease, as systems finished the procurement phase and became operational. If cost risk is taken into account, DoD's projected investment needs for missile defenses might be about \$4 billion higher each year.

Under CBO's transformational alternative, DoD would continue in its current plans for missile defenses—given that developing and deploying those defenses are considered key elements of transformation by many of that policy's advocates (see Figure 20 on page 44 and Table 6 on page 45). Thus, CBO's projection of costs under that alternative does not differ from its projection under DoD's

Figure 18.

Comparison of Evolutionary and Transformational Alternatives: Defense Agency Investment, Including Missile Defense

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

current plans. Under CBO's transformational alternative, DoD would expand the initial Ground-Based Midcourse Defense (GMD) system, develop a space-based sensor system for missile tracking, and pursue other boost-, mid-course-, and terminal-phase programs.⁶⁵ Under CBO's evolutionary alternative, DoD would complete deployment of the initial two-site GMD system but forgo deployments at additional sites as well as deployment of other terrestrially and space based sensors and interceptors.

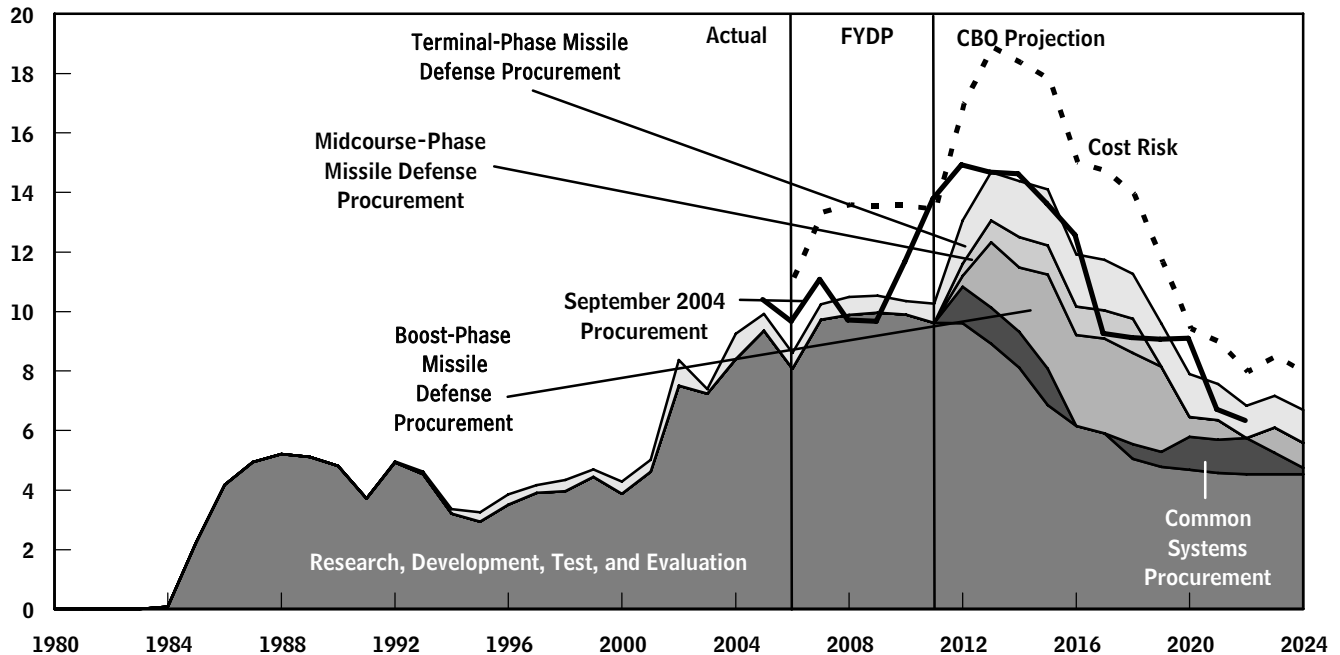
65. Boost-phase defenses attempt to destroy hostile missiles before their warheads separate from their booster rockets. Midcourse-phase defenses attempt to destroy warheads after they separate from their boosters but before they reenter the Earth's atmosphere. Terminal-phase defenses attempt to destroy warheads after they have reentered the Earth's atmosphere and are relatively close to their intended targets.

Midcourse-Phase Defenses. According to MDA, the Ground-Based Midcourse Defense system will evolve to comprise an integrated set of layered missile defenses deployed on land, at sea, and in space. The GMD system was planned to provide an initial defense capability (IDC) and be fully operational at the end of calendar year 2004. However, failures of the IDC during testing have caused DoD to delay putting the system into operation.

The IDC consists of 16 interceptors located at Fort Greeley, Alaska, and two interceptors positioned at Vandenberg Air Force Base in California. Those missiles would be used to intercept in their midcourse phase of flight warheads targeted at the United States. The IDC GMD system includes land-based radars as well as radars on Navy Aegis cruisers and destroyers and a large sea-based radar to be completed by 2006 and placed on an oil-drilling platform off the coast of Alaska. CBO's projec-

Figure 19.**Past and Projected Resources for Missile Defense Investment**

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: FYDP = Future Years Defense Program.

tion of DoD's current plans incorporates the assumption that the IDC will subsequently be expanded to include additional land-based radars and additional Aegis cruisers and destroyers as well as a third site for interceptor missiles that will not necessarily be located in the United States. Deployment of that expanded GMD system would be completed in about 2013 and cost roughly \$20 billion, CBO estimates.

Under CBO's projection of DoD's current plans, the Defense Department would also develop and deploy in low-earth orbit a constellation of space-based infrared sensor satellites. Those satellites would have the capability to detect and track missiles and their warheads from shortly after their launch to their reentry into the atmosphere and to relay those tracking data to interceptors in flight, enabling them to identify and hit the warheads. MDA calls that constellation the Space Tracking and Surveillance System (STSS) and currently plans to launch two so-called proof-of-concept satellites by 2006. Although DoD's earlier plans envisioned a constellation comprising 24 to 27 satellites, its current plans call for launching six to nine satellites. Under CBO's projection of DoD's cur-

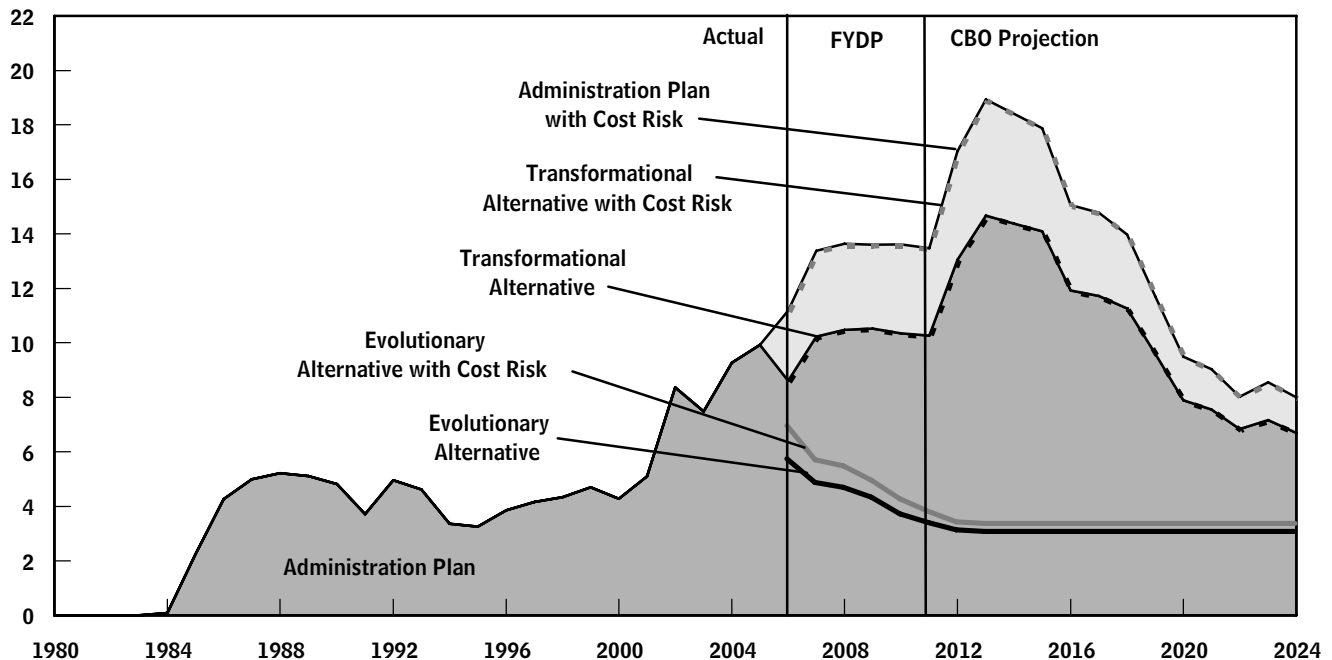
rent plans, MDA would have a nine-satellite STSS constellation in orbit by 2017.

Under CBO's evolutionary alternative, DoD would fund the capabilities planned for the GMD system through 2007—that is, 23 interceptors deployed at Fort Greeley, two interceptors at Vandenberg Air Force Base, and upgrades to existing ground-based early-warning (of ballistic missile attack) radars. Thereafter, no further deployments would be funded for GMD or for other ground- or space-based defenses. In particular, under this alternative, DoD would terminate the STSS program after launching the two so-called proof-of-concept satellites and would fund no further outfitting of the Navy's Aegis ships for missile defense missions. The department would, however, provide \$3 billion a year to pursue upgrades to the elements of the GMD IDC, continue testing its components, and explore other missile defense concepts. Relative to DoD's current plans for missile defenses and CBO's projection of their implications for costs, savings on midcourse missile defenses through 2024 under the evolutionary alternative would total \$29 billion on a DoD-wide basis.

Figure 20.

Comparison of Evolutionary and Transformational Alternatives: Missile Defense Investment

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Notes: By comparison with current plans, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.

FYDP = Future Years Defense Program.

Boost-Phase Defenses. Last year, MDA began developing a boost-phase, kinetic-energy interceptor system to destroy hostile missiles. A ground-based version of the KEI system is planned for initial testing in about 2011, with development of a sea-based version to occur later. MDA has described the system being developed as a multipurpose interceptor that could eventually replace the interceptors in the GMD system. CBO projects that initial deployment of the KEI system will be completed in about 2013. MDA also plans to develop a space-based test bed to support eventual deployment of boost-phase intercept defenses in space. CBO's projection of DoD's current plans incorporates the assumption that an operational space-based system will be available sometime in about 2017.⁶⁶

In addition to the KEI program, MDA is pursuing the Airborne Laser, which will consist of a high-energy chemical laser carried on a modified Boeing 747-400 aircraft. Under DoD's current plans, MDA would procure two aircraft for use in tests. CBO assumed that, consistent with previous plans formulated by both MDA and the Air Force, the Air Force would procure an additional seven operational aircraft by 2017.

66. CBO's estimates of costs for an initial KEI system and a space-based boost-phase intercept system are based on the analysis in Congressional Budget Office, *Alternatives for Boost-Phase Missile Defense* (July 2004).

Table 6.**Missile Defense Investment Through 2024 Under CBO's Projection Alternatives**

Category	Projection Alternative ^a		
	Current Plans	Evolutionary	Transformational
Ground-Based Midcourse Defenses	Deploy interceptors at at least one additional site	Deploy no additional interceptors	Deploy interceptors at at least one additional site
	Develop and deploy infrared sensors in space	Deploy no space-based sensors	Develop and deploy infrared sensors in space
	Upgrade additional radars	Pursue no further upgrades to radars	Upgrade additional radars
Boost-Phase Defenses	Develop and deploy the Airborne Laser	Pursue various concepts but only through the research phase	Develop and deploy the Airborne Laser
	Develop ground- and sea-based interceptors		Develop ground- and sea-based interceptors
	Develop space-based interceptors		Develop space-based interceptors
Terminal Defenses	Develop and deploy eight THAAD fire units ^b	Develop and deploy two THAAD fire units ^b	Develop and deploy eight THAAD fire units ^b
	Develop and deploy MEADS	Forgo MEADS	Develop and deploy MEADS
	Deploy the PAC-3	Deploy the PAC-3	Deploy the PAC-3

Source: Congressional Budget Office.

Note: THAAD = Terminal High Altitude Area Defense; MEADS = Medium Extended Air Defense System; PAC-3 = Patriot Advanced Capability-3.

- a. Current plans are those set out in the Future Years Defense Program. By comparison, CBO's "transformational" alternative would place more emphasis on acquiring the advanced weapons and capabilities that DoD associates with military transformation. CBO's "evolutionary" alternative would largely forgo those advanced systems and instead pursue upgrades to current capabilities.
- b. Fire units are the collection of vehicles needed to launch a missile.

Under CBO's evolutionary alternative, DoD would forgo additional deployment of all boost-phase programs, providing funding only for continued research and saving \$45 billion through 2024.

Terminal-Phase Defenses. CBO's projections of investment in missile defenses also include projected resources for systems that are designed to hit incoming warheads during the terminal phase of their flight. Such systems include the Patriot Advanced Capability-3 short-range missile defense system, the Medium Extended Air Defense System, and the Terminal High Altitude Area Defense system. All are mobile ground-based systems. The PAC-3, already in operation by the Army, will eventually be replaced by MEADS, which is an international joint venture with Italy and Germany. The THAAD system is

still being developed by MDA; however, CBO's projections incorporate the assumption that as the THAAD system's operational deployment proceeds beyond 2011, its funding will move from MDA to the Army. According to CBO's projection of DoD's current plans, annual funding for terminal defense systems averages \$1.7 billion a year through 2024.

Under CBO's evolutionary alternative, DoD would end work on MEADS and instead continue to upgrade the PAC-3 system. The THAAD program would be continued, but DoD would acquire only two fire units instead of eight. (Fire units are the collection of vehicles needed to launch a missile.) Total savings associated with the evolutionary alternative for terminal missile defenses would be about \$20 billion through 2024.